ABSTRACT

Now days, with advance of technology, most of the instructor using computer to create the exam and test paper. And the created files are just simply store in the particular lecturer's computer without any secure protection towards the files. This will lead to the disclosure of confidential data such as the exam question if there is any unauthorized users hack into the system and steal the file. As such, this is why Exam Question Management System (EQMS) comes in to bring a more secure environment to store all the exam questions.

Basically, EQM system is web-based system. This system provides a secure database to ease the staff in managing the exam, test and tutorial question while maintaining high security. This system also provides a feasible environment for lecturer to create, share and manage the exam question with more effective and efficiently. With this system, lecturer will be able to create, edit, view, and delete the question and paper. The paper created also can be shared among lecturer. Nevertheless, the capability of lecturer to access to particular course is restricted. Lecturer are only allow to access to designated course.

ACKNOWLEDGEMENT

During the preparation of this thesis project, many people have been giving helps and encouragement to me. I would like to use this opportunity to thank all of them.

First of all, I would like to express my heartfelt appreciation to my supervisor, Pn. Fazidah Othman for her kind guidance and patience. She had spent her precious time on supervised me and given her advice during the preparation of project. She has no doubt given me invaluable suggestion and many good useful advices to develop my system.

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Also never forgot about my project partner, Mr. Tang Kit Lim. He had been very helpful during my work. He had given me a deep understanding on how to use PHP to construct a web page. He also has been lending his hands while I'm facing problem during the development of project.

Last but not least, I wish to recode my appreciation to my fellow course mates and friends for sharing their time and knowledge with me. Their support and motivations are deeply appreciated and I so grateful to have their encouragement.

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CHAPTER 1 INTRODUCTION

1.1 Project overview

About ten years ago or may be earlier, the exam paper mostly will be created using a kind of stencil paper. Now days, with advance of technology, the computer can be used to help to create exam paper. As well for the lecturer, they also prepare the exam and test paper by using computer. At the meanwhile, after all the exam, test and tutorial questions have been created, the files just simply store in the particular lecturer's computer without any secure protection towards the files. This will lead to the disclosure of confidential data such as the exam question if there is any unauthorized users hack into the system and steal the file. As such, it is soon as a good opportunity to develop a secure system to store the exam question.

This project is taken up with the intention to create an Exam Question Management System. This system provides a secure database to ease the staff in managing the exam, test and tutorial question while maintaining high security. This system is use to share and manage the exam question by the lecturer. Lecturer may store the previous year exam question inside the database of the system. So that they can keep it as a reference for produce a new exam question for student. Beside of that, the exam question also can be shared with other permitted lecturer. The permitted lecturer can modified the exam question and then the files, either original file or modified file, both will save in the database. In addition, the test and tutorial question also can be shared among the lecturers.

1.2 Problem definition

Some major weaknesses stated below:

I) Not secure.

The question papers file normally just store in the computer without any protection. So it can be read by any unauthorized users, if they hack into the computer and get the file. In consequence, the question is leaked.

II) Inefficiency sharing among lecturer

If a lecturer wants to share the question paper with other lecturers, he or she has to manually send the file via email or save the file in the removable device and pass it to lecturers.

III) Lost of data

The question paper is keep by particular lecturer. He or she may lose the file. If there is no any backup of the file, he or she may need to get it from other lecturers. However, there is possible that other lecturer may not have the copy of the file. Hence, the data is lost.

1.3 Project objective

The objectives for developing this Exam Question (EQ) management system are listed as the following:

I. To create a secure database to store all created exam and tutorial questions.
II. To provide lecturer a feasible environment for lecturer to create, share and manage the exam questions with more effective and efficiently.
III. Enable sharing exam question among the lecturers.
IV. To create a more secure system for sharing exam question among lecturers.
V. Enable security method into the database where the exam questions are stored inside to avoid the leakage of the exam question before exam.
VI. To increase the efficiently of sharing and managing the exam question.

VII. To create a system with informative user interface, which are easy to understand and instructions that are clearly defined.

1.4 Project Scope

This project is about a system, which may simulate the processes and advantages of having a secure system to share and manage the exam question or tutorial among the lecturers. EQ Management System is a web application where users should have internet access. The target users are the lecturers from different department and administrator of the system. Administrator shall able to manage the access of lecturer towards the system. Where as lecturer can store the past year exam question as well as making a new exam question. In addition, tutorial, test or quiz also can be created and shared in the system.

Basically, the system can be used by 2 categories of user with different security levels: the system administrator and the lecturers.

The scopes for system administrator will cover:

I. Registration and login for lecturers.

II. Access control. Restrict the access capabilities of users of the system and prevent unauthorized users form accessing the system.

III. Current lecturer activity log files.

The scopes for lecturer will cover:

I. Exam Question, test and tutorial question maker.

II. Modification on an exam question. Both files, either the original exam question or the modified question, will keep in the database as well.

1.5 Expected Outcome

Below are some of the expectations of the project:

- Database system
- User login and registration interface system
- Exam editor system

Database system

Database is the core engine that will make the whole system run. It serves as repository which stores the information for the system. This section is constructed by a collection of database of the system. Those relational databases are integrated to make the system functionalities executable and feasible. These databases include the user profile and the exam question database for different subjects. Key feature that apply in this subsystem is Cryptography.

User login and registration system

In this section, valid users are allowed to enter into the system with authentication if passwords. Those who register are valid users. In registration, user information include password will be captured and stored. The registration will enable the user to use the service in the system. They can create, sharing, managing, and modifying the exam, test or tutorial question once they have access to the system. Key feature that apply in this subsystem is Authentication.

Exam editor system

This is the important feature of the system. This section is designed to allow user create, managing and sharing exam. The user can create a new exam question,

modified and save it. When the user choose to modify the question, the modified question's file will save in another new file instead of overwrite the origin file. This is because the lecturer might use back the origin question at last. In addition, the test and the tutorial question also can create, share and manage in this system. Key feature that apply in this subsystem is Secure Sockets Layer (SSL).

The system can be easily expended if additional capability and functionalities are required.

CHAPTER 2 LITERATURE REVIEW

2.1 Existing System Reviews

The review in existing system is to search for the similar characteristics, so that the existing features that offered by similar system can be included in the system s or enhance it into more powerful features in the project later. Beside of this, through the research, the strengths and limitations of several methodology and tools can be analysis. This will help in choosing correct methodology and development tools to develop the system.

2.1.1 Standardized Test System version 4 (Application System)

(http://www.findapp.com/fMgmt/pdetails.aspx?PID=5343)

Description:

This system can be run in network for the teacher to manage large-scale network test and in stand-alone computer to practice an exercise. This system enable user to create test paper easily by select test question from test pool or input test question manually. The user also can set up test pool (question can include true-false and multiple-choice question) and share the source of test pool in internet. The user can choose the paper as a test mode or an exercise mode. Time of test paper be submitted also can be fix by user and the test will be grade automatically. When the test is in LAN, all the test results will be saved in the LAN server (or the teacher end) automatically, safely and reliably, to analyze achievement automatically. The test paper also can output to WORD and analysis to EXCEL.

Supports and functions:

- To create test paper, to set up test pool

- To be a test mode or a exercise mode
- To grade test automatically
- To prevent cheat
- To analyze achievement automatically
- To output paper to WORD and analysis to EXCEL
- To support different classes to differently test at the same time
- To be run in network or single environment.

Restrictions. Limitations. and Constraints

- Questions can include true-false and multiple-choice question only
- No category for questions. Only can include selected question manually to related classes.

2.1.2 Random Test Generator-PRO version 8.2 (Application System)

(www.hirtlesoftware.com/p_rtgpro.htm) / (http://www.worldssp.net/DetailView.asp?proid=2586)

Description

Random Test Generator-PRO is designed for educators at any level to develop TestBanks to store test items. This test items then will be randomly selected to create students tests. There is no limit to the number of TestBanks and amount of test items to be stored in each TestBanks. This system provide Text-to Speech(TTS) features. These tests may be administered on the computer with an optional timer, printed on paper or administered via the Internet. Tests administered on computer may be automatically graded in second. Tests administered via the Internet allows students to easily submit their answers via email for grading with a single-click. This system also provides the ability to manually edit test item analysis data for paper and Internet tests. It creates numerous reports such as grade, test item analysis, test performance. It also provides the use of images and any other multimedia files with test items.

Restrictions, Limitations, and Constraints

- Random Test Generator-PRO is distributed as Shareware. Have to purchase a license
- System administrator will have to manually activate the exams
- Essay type questions won't be possible to be graded
- No category for lecturer
- TestBanks not protected from lecturers of other subjects.

2.1.3 Exam Editor (Web System)

(http://www.usd.edu/exam/examedit.html)

Description

The Exam Editor is a comprehensive program designed to create and edit interactive practice exam on the Internet. It creates exam directories and set password protection, creates exam files, and guide through the creation of various types of exam questions. It also allows editing or deleting existing questions, copy or delete exam files and directories, spell check exams, and even convert practice exams to real exams that can be given over the Web. The exams created are immediately ready for use on the Web without copying or modification. There is no size limitation for creating questions or exam. The Exam Editor creates multiple choice, matching and essay questions. Comments associated with each answer will tell the student why the answer is correct or incorrect so that something is learned by each trial.

Restrictions, Limitations, and Constraints

- Essay type questions won't be possible to be graded.
- Multiple choice, matching and essay questions only.
- No categories for subject, can't protect questions from lecturer of different subject.

2.1.4 Exam Builder (Web system)

(http://www.exambuilder.com)

Description

Exam Builder is a Web-based system that provide a easily create and administer exams over the Internet. It features a user-friendly interface designed for quickly upload exams and check results. Its suit of real-time reporting tools will produce instant access to valuable statistics. Reports creating at a moment's notice, determining question ranking with the click of mouse, sorting scores in a flash, and then graphing data in just seconds. It works within a standard browser over Internet.

Restrictions, Limitations, and Constraints:

- Only 3 question types available: multiple choices questions, fill-in-blank and true/false.
- Presentation style of the exam is fixed because user is not allowed to change the font style, size and other properties.
- Does not let the picture or graphic to be added to the questions.
- Rather suitable solution for online exam which benefit both the teachers and student.

2.1.5 Test Generator : 2 (Web System and Application System)

(http://www.testshop.com)

Description

Test Generator allows test authors create, store and manage one or more question banks. Question banks can be organized by subject, objective, level of difficulty, grade and question type- any classification system that chooses. Questions can be created directly in a question bank, imported from a test or from one question bank to

another. Media is support in this system. Media can be used in support of a question, as feedback or, in the case of the Point-and-Click question-type, as the answer. It enables the test creation process by randomly selecting questions from one or more question banks, generating a test minutes. It also enables administrators and instructors to view and analyze a variety of reports. These reports provide a broad range of information organized by student, test, class, question, subject and more. Report can be viewed on screen, printed or exported. It has the advantages to ensure the correctness and the completeness of the question.

Restrictions, Limitations, and Constraints:

- The process of generating question has some drawbacks in which the user is required to set the answer setting separately.
- If there is missing information, user can not save the question.
- Ensuring correctness and the completeness of the question may slow down the system.

2.1.6 ExamPro (Application System)

(http://www.exampro.co.uk)

Description

Exampro was designed with aim to produce a tool that would save time in compiling homeworks, tests and mock examinations. A user can creates a homework or test by searching for questions, viewing them and then dragging and dropping them onto the document. The user also can use past exam questions and materials to create their own tailor-made teaching resources and mock exam. The questions can be export to Microsoft word. This system allow user to create and print out examiners' reports and the markshemes. Furthermore, user can creates spreadsheets to enter and analyse

pupil's mark. This system also provides the function to search and select questions by topic, unit, specification, type or level.

Restrictions, Limitations, and Constraints:

- The ExamPro does not provide any types of question for teachers to choose for.
- Teachers are not provided with any template for different type.
- Does not let the picture or graphic to be added to the questions.
- Rather suitable solution for online exam which benefit both the teachers and student.
- Time consuming because the creation of questions may be slow down.
- Not user friendly enough, user may need time to explore the system before get familiar with it

2.1.7 Exam Manager 1.0 Demo (Application System)

(http://www.examanager.com)

Description

Exam Manager is an educational delivery and testing tool that administers multiple-choice and case based study exams. It enable user to create, manage and administer exams on a computer screen or on paper, while delivering an educational resource of study materials to student users. Basically, this system comes with 3 main user types: administrator, faculty user and student. There is only 1 administrator for Exam Manager. This user is in charge of housekeeping and administrative duties, such as adding or deleting users, keeping track of exam files and edit lookup tables, such as competencies, categories and user types. The faculty user can create exams from an existing database of questions, case studies and images. The system also allow user to add original questions, case studies, or images to the database. User can print various types of reports by class or by group of students and view students' performance by

exam, category, or competency. The student user can quiz or review exams, and generate random exams. This user also can save exam scores and view their performance by exam, category and competency.

Supports and functions:

- Used by network (only for client-server Multi-User version and web version)
- Exam on screen or print (normal print)
- Score on screen only
- Allowed picture.

Restrictions, Limitations, and Constraints:

- Multiple choice questions only.
- Can be used on single machine only (Application Demo version)
- Questions stored in databank according to categories, all databank and questions for any category can be access by every lecturer
- Exam for any category can be taken or review by every student.

Summary, most of the systems that we have tested above come with the following similarities:

- Can create online assessment.
- Allowed student as a kind of user to take assessment.
- Do not support printing template
- Categories (subjects) exist but no control over questions in a category.
- Do not use SSL for security purpose.
- Undisclosed the database system's functionalities. So cannot identify whether database encryption is being applied or not.

CHAPTER 3 METHODOLOGY

3.1 Project Development Life Cycle

Methodology are comprehensive, multiple-step approaches to systems development that will guide the work and influence the quality if final product—the system. In order to develop and maintain computer-based information systems in an organized and effective way, it is necessary to follow a systematic and sequence of activities or step to accommodate a computer set of tasks, which is known as process. Each process model represents a process from a particular perspective and thus provide only partial information about that process. There are many type of process models in system development. However, only three models are being considered before choosing the most appropriate. There are Waterfall model with prototyping, evolutionary prototyping model and spiral Model.

3.1.1 Waterfall with prototyping

Waterfall model can be combining with prototyping to improve understanding. It is simple to user. Waterfall model with prototyping consists of 8 stages that are depicted as cascading from on to another (see figure 3.1). Each phase is in strict order, without any overlapping or iterative steps. There are:

1. ***Requirement phase***. Understanding and determining users need by having brainstorming, eliciting and analyzing user requirements by interview, survey or questionnaire session, collecting and specifying all the user requirements and validating requirements.

2. ***System Design Phase***. Flow chart and structure chart is designed to show the overall view in which how the data is passes and the system is communicate with each other.
3. ***Program Design phase***. Determining and specifying program design and database design and verifying program design.
4. ***Coding Phase***. Programming, personal planning, tool acquisition, database development, component level documentation and programming management.
5. ***Unit and Integration Testing Phase***. Units are tested separately. Then the tested units is integrated and tested together.
6. ***System Testing Phase***. All the integrated units is combining into system and a testing is carried out onto the system. Specifying, reviewing and updating of the system test and validating of system.
7. ***Acceptance Testing Phase***. Testing on completed system. The system is delivered.
8. ***Operation and Maintenance Phase***. Control and maintain the system. Revalidating of system.

Prototyping is incorporate into waterfall model because it is vital to test out the functionality of its models of development. Prototyping is a sub-process and is partially developed product or a simple simulator of the actual system to examine some aspect of the proposed system and overview on the functionalities. Prototyping is important because it ensures the system meet the performance goals or constraints, ensures the system are practical and flexible, ensures the system fulfil the user's requirement and have an insight of how the module and sub-modules interact with each other. Benefits of waterfall model with prototyping are simplicity of explanation, systematic and organized, more other models are establishment of it and it makes

explicit which intermediate products are necessary to begin the next stage of development.

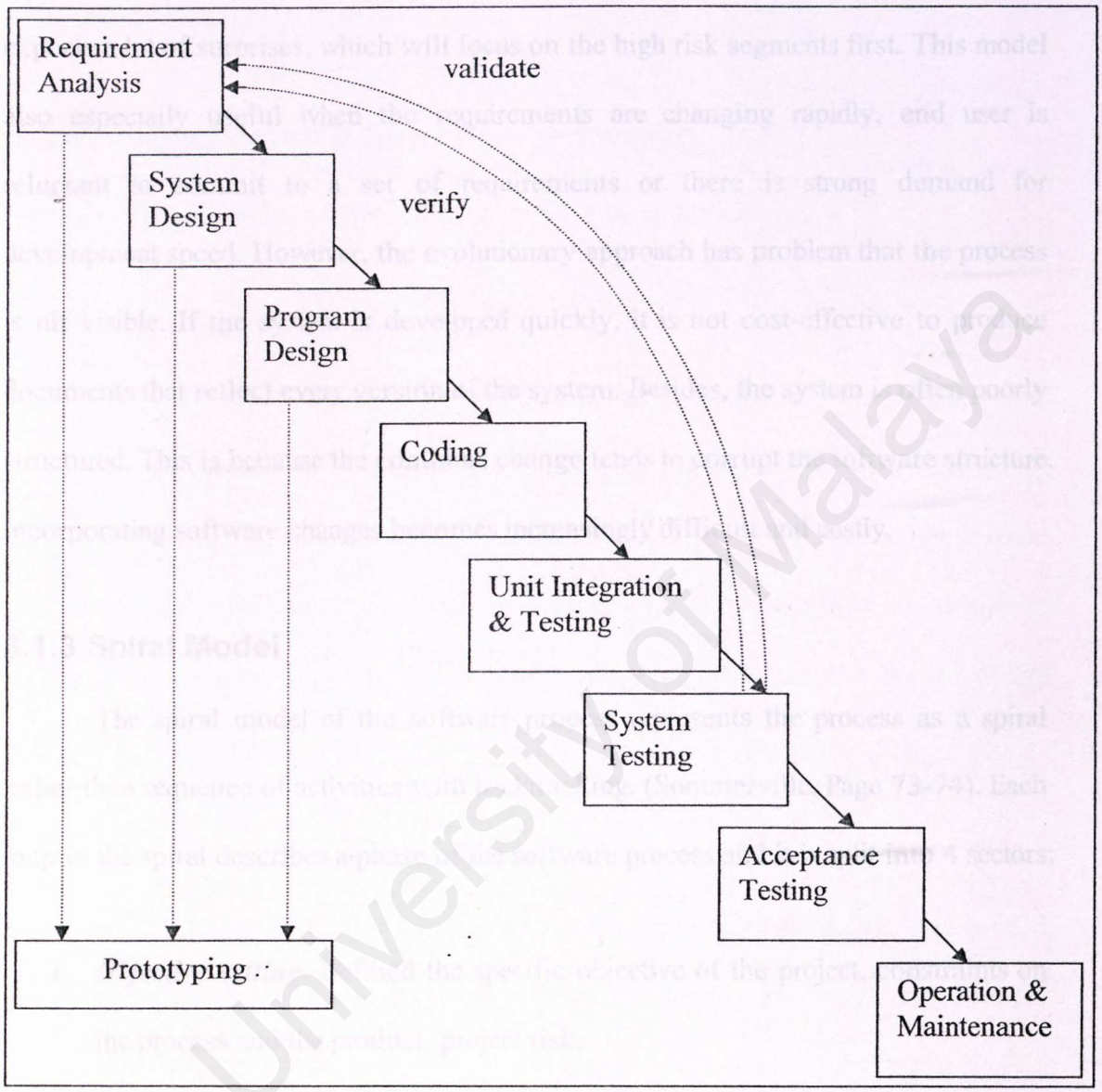

Figure 3.1: Waterfall with prototyping model

3.1.2 Evolutionary Model

Evolutionary model is based on the idea of developing an initial implementation, exposing this to user comment and refining it through many versions until an adequate system has been developed. (Sommerville, Page 68-69). An evolutionary approach meets the immediate needs of users. The advantage for this

model is that the specification can be developed incrementally so it can be modified in response to the end user and customer feedback.

This model is more suitable for user when the system is poorly understood and expects a lot of surprises, which will focus on the high risk segments first. This model also especially useful when the requirements are changing rapidly, end user is reluctant to commit to a set of requirements or there is strong demand for development speed. However, the evolutionary approach has problem that the process is nit visible. If the system is developed quickly, it is not cost-effective to produce documents that reflect every version of the system. Besides, the system is often poorly structured. This is because the continual change tends to corrupt the software structure. Incorporating software changes becomes increasingly difficult and costly.

3.1.3 Spiral Model

The spiral model of the software process represents the process as a spiral rather than sequence of activities with backtracking. (Sommerville, Page 73-74). Each loop in the spiral describes a phase of the software process and it is split into 4 sectors:

1. ***Objective setting***. Defined the specific objective of the project, constraints on the process and the product, project risk.
2. ***Risk assessment and reduction***. Detailed analysis is carried out for each of the identified project risks. Steps are taken to reduce the risk.
3. ***Development and validation***. A development model for the system is chosen after risk evaluation.
4. ***Planning***. The project is review. Decision whether to continue to further the spiral loop is made. If decided to continue, plans are drawn up for the next phase of the project.

Spiral model is suitable for large-scale, in-house products. Developers have to be competent in risk analysis and risk resolution. This model is failed if risks are inaccurate defined.

3.2 Approaches on Information gathering

To gather the information, some techniques have been carried out:

1. Brainstorming / Discussion.

   Discuss with the supervisor about the requirements of the system to gain idea, advices, recommendations and information of requirements and proceedings of the project. The discussion likewise also exists within the project partner. We discuss about the requirements of the projects, system flow and design of the system. Abundance of ideas about the requirements and design of the system have been figured out the system.

2. Library

   There is a lot of materials in the library such as journal, conference and reference books offer a relatively concise information and format for research. It offers a good starting point intended for teaching and from which to find more detailed sources.

3. Document Room

   Another source for gathering information is library in Faculty of Science Computer and Information Technology. There is some thesis project that done by senior student are related to this project and it is useful in providing

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3. Document Room

   Another source for gathering information is library in Faculty of Science Computer and Information Technology. There is some thesis project that done by senior student are related to this project and it is useful in providing

information regarding to the software, which can be used to develop the system.

4. Internet Searching

There are many related projects and systems are published in the internet. Tried out some of the related software and compare the software between each other in order to get the best solution for the system development.

3.3 Software Architecture

There is some software architecture available: mainframe architecture, client-server architecture, two-tier architecture and three-tier architecture.

3.3.1 Mainframe Architecture

The concept of the mainframe architecture is that all operation is within the central host computer and the user interacts with the host through a terminal. The terminal is responsible to captures keystroke and sends the information to the host. A limitation of mainframe architecture is that it is not easy supports graphical user interface or accesses to multiple databases from graphically dispersed sites.

3.3.2 Client-server Architecture

Client-server is network architecture in which each computer or process on the network is either a client or a server. Client-server architecture implies a cooperative processing of requests submitted by a client, or requester, to the server, which processes the requests and returns the results to the client. The client manipulates the data and presents the result to the user. Client-server architecture reduces network

traffic by providing a query response rather than total file transfer. It improve multi-user updating through a GUI front-end to shared databases.

3.3.3 Two-tier Architecture

For two-tier client-server architectures, the user system interface is run on the client and the database services are usually in a server which is more powerful. The two-tier client-server architecture is a good solution for distributed computing when there are many users interacting on a LAN simultaneously. But the performance will deteriorate when the number of users is increased to a certain number and the implementation of processing management services using vendor proprietary database procedures restricts flexibility and choice of DBMS for applications. Besides, it is limited flexibility in moving program functionality from one server to another server without manually regenerating procedural code.

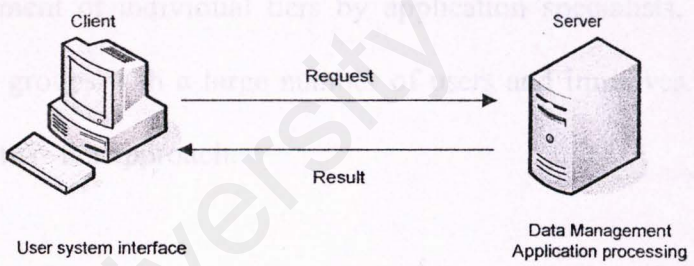


Figure 3.2: Two-tier client-server Architecture

3.3.4 Three-tier Client-server Architecture

Three-tier client-server architecture consisting of three well defined and separate processes that each running on a different platform: (see Figure 3.3)

- ***Presentation logic***. Represents the user interface, for displaying data to the user and accepting input from the user.

- ***Business logic***. For data validation, ensuring data correctness before add to database.
- ***Data Access Logic***. Database management system(DBMS) that stores the data required by the middle tier.

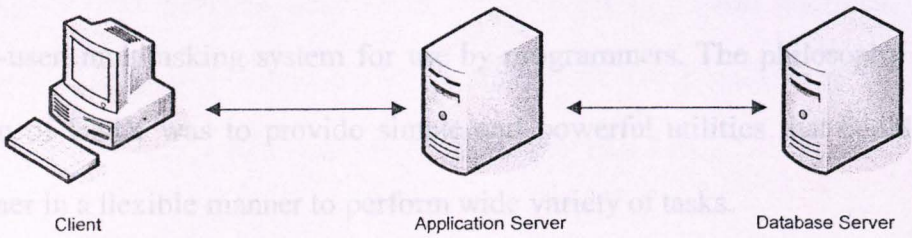


Figure 3.3: Three-tier client-server Architecture

The three-tier architecture attempts to overcome some of the limitations of the two-tier scheme by separating presentation, processing and data into separate distinct entities. Besides, this architecture having separate software entities allows for the parallel development of individual tiers by application specialists. It also improve performance for groups with a large number of users and improves flexibility when compared to the two-tier approach.

3.4 Operating System

An operating system(OS) is a set of computer programs that control the computer hardware and acts as an interface with application programs. It is a platform that performs basic tasks such as recognizing input from the keyboard, sending output to the display screen, keeping track of files and directories on the disk and controlling peripheral devices such as disk drives and printers. OS make sure that different programs and users running at the same time do nit interfere with each other. The most popular OS currently are UNIX, LINUX, Windows 98, Windows 2000 and Windows XP.

3.4.1 UNIX

UNIX, like other operating system, is a layer between the hardware and the applications that runs on the computer. It has functions that manage the hardware and functions that manage the execution of applications. UNIX is designed to provide a multi-user, multitasking system for use by programmers. The philosophy behind the design of UNIX was to provide simple and powerful utilities that could be pieced together in a flexible manner to perform wide variety of tasks.

UNIX is consistent in treating files. It is very easy for the users to work with files because users do not need to learn special command for every new task. It is a powerful and mature operating system and network-based application.

However, UNIX needs very powerful workstations. So, it is not cost effective to use. And it is not widely supported as Microsoft windows 2000.

3.4.2 LINUX

Linux is a free Unix-type operating system. Linux is stable and high performance OS for internet usage. Linux has made progress, primarily in functionality important to Internet infrastructure and web server capabilities, including a greater selection of drivers, easier installation, GUI-based front ends for web administration and window management. Memory management is dynamic and used memory is released after a particular application ends. Linux supports a wide range of software, from TeX (a text formatting language) to X (a graphical user interface) to the GNU C/C++ compilers to TCP/IP networking.

3.4.3 Windows 98

Windows 98 is designed for backward compatibility with other older DOS and 16 bit programs, as well as providing a platform for the newer (back in 1995) 32 bit programs. Windows 98 provide simple access to the Internet and better system diagnostics and maintenance. It also support for the latest graphics, sound and multimedia technologies and ability to add or remove peripheral devices. Besides, Windows 98 is compatible with more software and hardware.

3.4.4 Windows 2000

Windows 2000 is designed to appeal to small business and professional users as well as to the more technical and larger business market. Windows 2000 enables a company to set up virtual private networks (VPN) to encrypt data locally or on the network and to give users access to shared files in a consistent way from any network computer. Windows 2000 also provide high reliability, interoperability, with high-level security and significant enhancements for laptop users, application support and hardware support.

3.4.5 Windows XP

Windows XP is built on the Windows 2000 kernel with more personalized look to the desktop that make it easier for users to scan or import images and to acquire music file on the web and transfer them to portable devices. Window XP is more easily recover from system problems. The system restore features enable user to revert the system to a previous state when something goes wrong in computer. Windows XP is easy to use because of its intuitive, task-based design. Windows XP also provides Encrypting file system that provides high level of protection with a randomly generated key.

However, sharing XP with more than one machine in the house in not acceptable. Besides, some of the software and hardware won't operate under XP without updated patches or drivers.

3.5 Database Server

Database is a structured collection of data. Database server is needed for add, access and process data stored in database.

3.5.1 Aracle 9i

Oracle is a multi-user database that provides unprecedented ease-of use, the highest levels of availability through fast fail over, easier management and zero data loss disaster protection. Oracle 9i includes OLAP, ETL and data mining tools. It consists of advances partitioning options which are the new feature of the database management system. Oracle cab runs on UNIX, Linux and Windows platform. However, it is expensive and separate licenses are required for each of its database engine.

3.5.2 Microsoft SQL Server 2000

Microsoft SQL Server 2000 is a single process, multithread relational database server primarily intent for transactional processing that provides agility to data management and analysis. It allows to adapt quickly and gracefully to derive competitive advantage in a fast changing environment. MS SQL is based on the client-server architecture, which divides processing into two components. There are front-end or client component, which is run on a local workstation, and back-end or server component, which is run on a remote computer.

3.5.3 MySQL

MySQL is Open Source Software that anyone can download from Internet and use it freely. MySQL is a relational database management system that stores data in separate tables. This makes it more flexibility and fast. MySQL is a small, compact, easy to use database server, ideal for small and medium size application. It is based on the client-server architecture that consistes of a server and many different client programs. It can runs on variety of UNIX platforms, Linux, Windows NT, Windows 95/98/2000/XP.

3.6 Web Server

Web server is strategic components for any IT infrastructure that provide a run-time environment and back-end services. The choice of web server will ultimately depend on which platform has been selected.

3.6.1 Apache

Apache provides freely distributed source code, active user support for the server, cross-platform support, protocol support (HTTP), modularity (API), security, logging and overall performance and robustness. Apache distributes a set core of modules that handle everything from user authentication and cookies type correction on URLs. Apache is a good choice for enterprise-level websites and for individuals as workshop, due to its robust design and extensibility, coupled with its freeware status and the availability of its source code to the public

3.6.2 Internet Information Services 6.0 (IIS6.0)

IIS provides Internet server, including web or Hypertext Transfer Protocol (HTTP) server and File Transfer Protocol (FTP) server. IIS includes a set of programs for

building and administering web sites a search engine and a support for writing web-based applications that access database.

3.7 Programming Language

Programming language is a language used to write code or instructions for the computer.

3.7.1 Active Server Pages (ASP)

ASP is a server-side scripting technology. Pages using ASP are primarily developed in JavaScript or VBScript and are integrated into HTML web pages. When a browser requests an ASP page, the web server generates a standard HTML page and sends the HTML page back to browser.

ASP is easy to develop applications. It is powerful and flexible. It also provides the use of cookies to store and retrieve information. The Request object has a Cookie collection and user can use this in data processing.

However, the weakness of ASP is its inherent limitations of scripting languages, insecure nature of text-based scripting, performance of interpreted scripting and limited transactional participation.

3.7.2 PHP

PHP is an easy-to-use and freely downloadable scripting language. PHP as a server-side scripting language is its ability to receive and process HTTP requests containing data collected from a HTML form. PHP offer excellent connectivity to most of the common databases, including Oracle, Sybase, MySQL, ODBC and many more. It also offers integration with various external libraries, which allow the developer to do anything from generating PDF documents to parsing XML.

Nevertheless, certain functions of PHP may be prohibited on a web server, due to the risks they entail, such as file management on the server, network protocol management, sending email, etc.

3.7.3 Java Server Page (JSP)

JSP is a template for a web page that uses Java code to generate an HTML dynamically. Although the specification allows other scripting platforms based on simpler languages like JavaScript and VBScript to be used, JSP with Java will be more flexible and robust. The dynamic part of JSP is written in java, so it is more powerful and easier to use. It is also portable to other operating system (platform independent) and non Microsoft web server.

3.7.4 JavaScript

JavaScript is a scripting language that enables interactive sites to be designed. Being client-side script, JavaScript is very fast because any code functions can be run immediately instead of having to contact the server and wait for answer. JavaScript is easy to learn and implement. It can interact with other languages and can be used in a huge variety of applications. It is supported by recent browsers from Netscape and Microsoft, though Internet Explorer supports only a subset, which is known as Jscript for Microsoft.

CHAPTER 4 SYSTEM ANALYSIS

4.1 System Requirement Analysis

System requirement analysis is an important process to determine the system being built in order to meet the customer's requirements. Ideally, the system requirements should simply describe the external behaviour of the system and its operational constraints. There are two types of requirement, functional requirement and non-functional requirement.

4.1.1 Functional Requirements

Functional requirements are a statement of the services that a system should provide how the system reacts to particular inputs, and how the system should behave in particular situations. [Sommerville, Page 119]

The EQ Management System consists of 2 sections. There are Administration section and Lecturer section. For Lecturer Section, functional requirement consists of Question Management Module and Paper Management Module. For System Administrator Section, functional requirements include Department Management Module, Course Management Module, Lecturer Management Module and Access and Activity Log Module. And there is an Authentication and Authorization Module, and Personal Detail Module for both System Administrator Section and Lecturer Section.

4.1.1.1 Authentication and Authorization module

This module functions as a medium for the system user, regardless whether they are system administrators or the lecturers, to enter the system. The module provides a login function, which user must enter username and password to enter the

system. Allow only authorized users to access the system and deny access to unauthorized users.

4.1.1.2 Personal Details Module

This medium functions as a storing location for all information on all the registered users of the system. This functional module will not interact with any user, unless the user wishes to change the details of him or her after logging in. In this module, user will be able to view and edit their profile. For Lecturer Section, it will be more a function that list and view the Course In Hand for lecturer.

4.1.1.3 Department Management Module

This medium is only used in Administrator Section. This module allow administrator to add new department into database, editing the existing department, delete the department from database, list all the department contain in the database and view the information of department.

4.1.1.4 Course Management Module

This medium only include in Administrator Section which is allows the administrator to manage the course. The system can add, edit and delete course from the system. Administrator shall be able to assign course into department. Besides, administrator also allows to search and list the course, and view the course detail.

4.1.1.5 Lecturer Management Module

This module allows the system administrator to manage the lecturer. The system make it available for administrator to add, edit lecturer details or delete lecturer from the system, assign course to lecturer, search and list lecturer, and view lecturer details.

4.1.1.6 Access and Activity Log Module

This module only available for System Administrator Section. This module will allow the administrator to view, search, print and delete lecturer activity log files.

4.1.1.7 Question Management Module

The module allows the lecturer to create a new question and add it to database, editing the existing question, delete the question from database, search for question, list and view question.

4.1.1.8 Paper Management Module

Basically, this module allows lecturer to create new paper, modify or delete paper, list and view paper, print paper and also assign the question to paper.

4.1.2 Non-Functional Requirements

Non-functional requirements are constraints on the services or functions offered by the system. [Sommerville, page 119].

4.1.2.1 Reliability

The system should convince the user with reasonable explanation that the information or recommendation provided is reliable. It is closely related to correct link processing, error recovery and user input validation and recovery. The system shall deliver services to the user as expected. The hardware and software components of the system shall be able to work smoothly without causing problem to the system. It should provide stable performance that the user can rely on. The database should stable enough as the data saved is vital to the system and also to the user.

4.1.2.2 Security

The main concern of the EQM System is the security issues. The exam question must be kept confidential to any unauthorized parties. This is to avoid the leakage of the question before the exam. The username and password will be encrypted, as well as for questions and answers. The EMQ System also limits the access capabilities of users of the system. It shall posses only authorized user can enter and access to particular course.

4.1.2.3 User friendly

The system should have an attractive and easy-to-use application so that users will not be confused when using the system. Main buttons are being provided in each web page to help user to navigate in the system. There will be a consistent interface throughout all screen displays. Confirmation message or any non-trial process such as deleting a record will be given.

4.1.2.4 Maintainability

The system should be easy to maintain by the system developers in order to add in new data or information. Maintainability is the ease with which a program can be corrected if an error is uncounted, adapted if its environment changes, or enhanced if the user desires a change in requirements. In this case, a good programming practices is needed for ease of system maintenance.

4.1.2.5 Functionality

The functionality of the system is stress on the searching and retrieving capability. This is important for a web-based application that deals with data insertion into database and data retrieval from existing database. Besides, navigation and

browsing features as well as application domain-related feature will be taken into account.

4.1.2.6 Performance

Performance is how the system should perform when it is delivered. The system shall be able to deliver services to the users at certain level of quality. It also should be able to handle more than one user concurrently. The system should be able deliver relatively good response time in handling the user's request. The display time for the questions must as short as possible. The response time should be less than 15 seconds to provide an efficient online system.

4.1.2.7 Flexibility

The EQM System should be implemented in changing environment, which is able to let user access from multi-platform. It should be able to let the users to access the system whenever the users locating and retrieving the appropriate output easily.

4.1.2.8 Robustness

Robustness refers to the ability of the system to continue in operation despite facing unexpected problems. The system shall be able to retain operating under any occurrence of system errors or failures, either it is accidentally or intentionally caused.

4.2 Methodology Choosing and Justification

Waterfall Model with prototyping is chosen for EQM System based on its several convincing reasons that support and routing throughout the whole developing progress of this system. It is a good specification to begin with, easy to use, and systematic. In addition, this model is expected to help me lay out what the system

needs to do in an order way. Its straightforwardness and simplicity make it easy to explain to others who are may be not familiar with the EQM System development.

4.3 Software Architecture Choosing and Justification

Three-tier architecture was chosen on this project because it is easier to implement and design. Its added modularity makes it easier to modify or replace one tier without affecting the other tier. And the separating application functions and database functions make it easier to implement load balancing. It is also has the ability to support transaction by huge number of users on the server at the same time.

4.4 Development Tools Choosing and Justification

4.4.1 Operating System

For the EQM System, Windows XP is chosen as the development platform because it is an improvement of Windows 2000 Professional and it si stable to use.

Windows XP is easier and faster to use compare with the earlier version of Windows. This is because Windows XP makes it easier to find information and programs and faster establish of tasks such as customizing computer settings, using and printing files and documents. Besides, Windows XP delivers a new level of stability, which enable the user can focus on their job. For instance, programs still can run while another program is crashes.

4.4.2 Database Server

After considering some DBMS in the market, MySQL is chosen for EQM System.

MySQL is chosen because it is relatively fast and easy to learn. Besides, MySQL requires less system administration to configure and maintain. It also has a

larger user base and is supported by more applications. MySQL can work effectively with PHP which is chosen as main programming Language for EQM System.

4.4.3 Web Server

Apache Server has been chosen as a web server for this project because it is support readily available from worldwide developer and user communities. It is a flexible and powerful URL rewriting. Apache also rich of feature set and it is extensible, which enable it to link new modules into the core server.

4.4.4 Programming Language

PHP is chosen because it is simple and easy to understand. Built-in extensions that bundled with each PHP installation offer far more functionality than desired by most developer. Simple functions such as FTP, data compression, file uploads, MD5, encryption and email are also included in PHP. Complex functions such as dynamic images, IMAP, SNMP, dynamic flash, PDF, native access (non ODBC) to Oracle, Ovrimos, Postgre, Sybase, MSql, MSSQL, Ingres, Interbase and Informix databases, LDAP, and sockets are available for free to any installation of PHP.

4.5 Development Requirements

4.5.1 Hardware requirement

Basic requirement for hardware as listed below:

Server Side:

- Intel Pentium III 450 MHz or above.
- 128 MB RAM (256 MB RAM recommended)
- 2GB free hard disk space
- 56K Modem / Network card NIC 10/100

- VGA Display Card with 64 MB minimum
- Keyboard and mouse

Client Side:

- Pentium III 250 Mhz and above
- 128 MB RAM (256 MB RAM recommended)
- Above 200 MB free space recommended
- 56K Modem / Network card NIC 10/100
- Keyboard and mouse
- VGA Display Card

4.5.2 Software Requirements

Development phase:

- Macromedia Dreamweaver MX
- Microsoft Windows XP (or other operating system)
- MySQL Server for the database

Server Side:

- Microsoft Windows XP
- MySQL Server 4.1 as the relational database
- Apache HTTP Server 2.0.52
- Microsoft Internet Explorer 6.0 / other compatible Webpage Display software

Client Side:

- Microsoft Windows 98 / 2000 / ME / XP
- Microsoft Internet Explorer 6.0 / other compatible Webpage Display software
- Connection to Internet

CHAPTER 5 SYSTEM DESIGN

5.1 Introduction

System design has an important role and is a meaningful engineering representation of something that is to be built. The objective of system design is to transform the defined requirement into complete, detailed specifications for the system to guide the work of the development phases.

System design addresses how the system will met the defined functional, physical, interface and data requirement. At each stage, software design work products are reviewed for clarity, correctness, completeness and consistency with the requirement and with one and another in determining the success of a software project.

System design includes the following issues:

i. System Architecture Design

ii. System Functionality Design

iii. User Interface Design

iv. Database Design

5.2 System Architecture Design

The EQ Management System is function in three-tier client server architecture. This is the basic of any web based system that involves the generation of dynamic web pages. The three-tier client server architecture consists of 3 device layers. The first is the client, a web browser for the user interface. The second is the application server, a web server connected to a "middle tier" application. The third

tier consists of applications and their associated database, a persistent store that is frequently a relational database. (Refer to Figure 5.1).

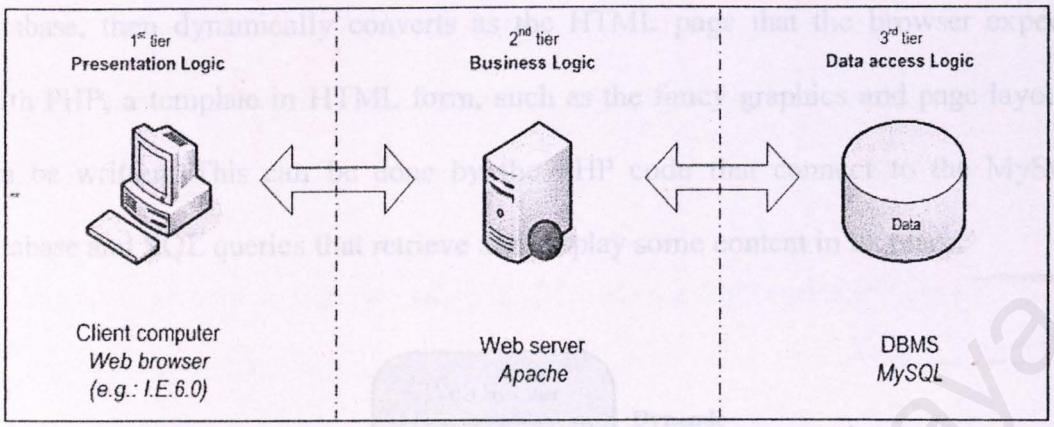


Figure 5.1: Three-tier client server architecture

In this system, the first tier (also called client tier) shall be the web browser such as Internet Explorer 6.0, Netscape Communicator 6.0, etc. this tier contains all the things that are visible to users in graphical user interface (GMI) which is displayed in web browser. The GMI contains the techniques like HTML, CSS, JSP and so on.

Meanwhile, the applications will reside within a web server (Apache) in second tier. Apache HTTP Server 2.0.52 in this system is responsible to manage the data. The request from the client will be processed by the web server and required results are returned in the web page format and displayed in interface (web browser). The server also will interact with database server to process data. To retrieve data from the database, the query is used.

Third tier consists of MySQL acts as database server. It is responsible to maintain the data repository.

The database-driven websites allows the site's content resides in a database. The content will be dynamically retrieved from the database to create standard HTML

web pages and displayed in client side's web browser. As shown in the diagram below (figure 5.2), the php scripting language is acts as an intermediary between both languages. It processes the page request and retrieves the data from the MySQL database, then dynamically converts as the HTML page that the browser expects. With PHP, a template in HTML form, such as the fancy graphics and page layouts, can be written. This can be done by the PHP code that connect to the MySQL database and SQL queries that retrieve and display some content in its place.

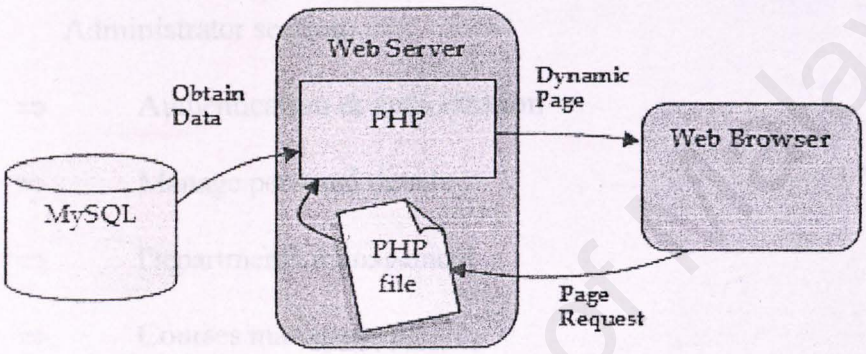


Figure 5.2: PHP scripting language and MySQL database engine architecture

5.3 System Functionality Design

System functionality design is based on the system functional requirement. It translates the system requirement into system functionality in functional design, large systems are decomposed into simpler modules that provide some related set of service. The reason why modularity is desirable is because a modular system is easy to understand, code, debug and maintain.

5.3.1 System Structure Charts

Structured chart is based on the functionality modules. It is issued to represent high level abstraction on a specified system. A structure chart is a tree-like diagram showing the interaction between modules in a system.

The following chart shows the hierarchical representation between the modules and the functions of every module in the EQ Management System. The system consists of 2 major parts, which are the Administration Section and the user (lecturer) Section. Each module is further divided into sub-modules. It is more effective in presenting the system structure using graphical representation rather than process or narrative.

The EQ Management is decomposed to the following modules: (Refer figure 5.3).

- Administrator section
  - ⇒ Authentication & authorization
  - ⇒ Manage personal details
  - ⇒ Departments management
  - ⇒ Courses management
  - ⇒ Lecturers management
  - ⇒ View log
- User (lecturer) section
  - ⇒ Authentication & authorization
  - ⇒ Manage Personal detail
  - ⇒ Questions management
  - ⇒ Exam papers management

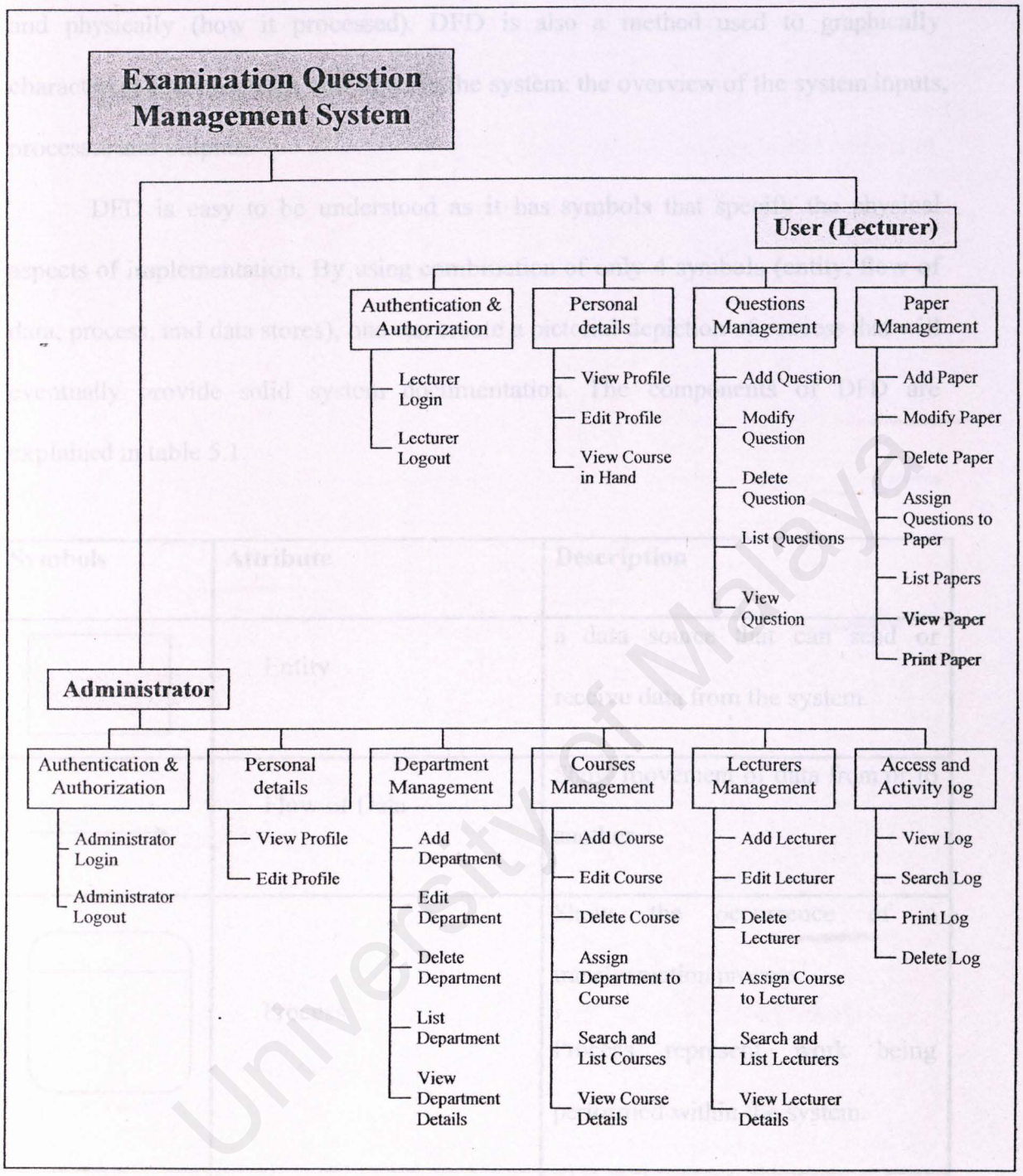


Figure 5.3: Structured chart of EQ Management System

5.3.2 Data Flow Diagram (DFD)

The system data flow diagram (DFD) is a tool that shows functional decomposition, with emphasis the flow of data in and out of the system and between program units.. It shows the movement of info logically (what are being processed)

and physically (how it processed). DFD is also a method used to graphically characterize data processes and flows in the system: the overview of the system inputs, processes and outputs.

DFD is easy to be understood as it has symbols that specify the physical aspects of implementation. By using combination of only 4 symbols (entity, flow of data, process, and data stores), one can create a pictorial depiction of process that will eventually provide solid system documentation. The components of DFD are explained in table 5.1.

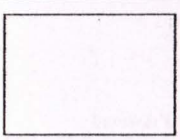
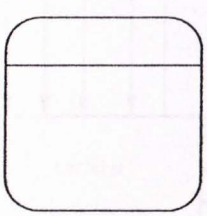
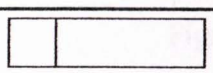
Symbols	Attribute	Description
	Entity	a data source that can send or receive data from the system.
	Flow of Data	Show movement of data from or to another.
	Process	Show the occurrence of a transformation process. Process represent work being performed within the system.
	Data Store	Represent a data store. It is within and under the control of the system under analysis.

Table 5.1: DFD Symbols

The following figures show the DFD and data flow of all process for the EQ Management System. Figure 5.4 illustrates the Context Diagram, where the context diagram is a special kind of data flow diagram used to depict the inputs and outputs of the system as a whole. Figure 5.5 illustrates the Diagram 0 for the EQ Management System. Meanwhile, Figure 5.6, Figure 5.7, Figure 5.8, Figure 5.9, Figure 5.10, Figure 5.11, Figure 5.12, and Figure 5.13 show the child diagram for some process in Diagram 0.

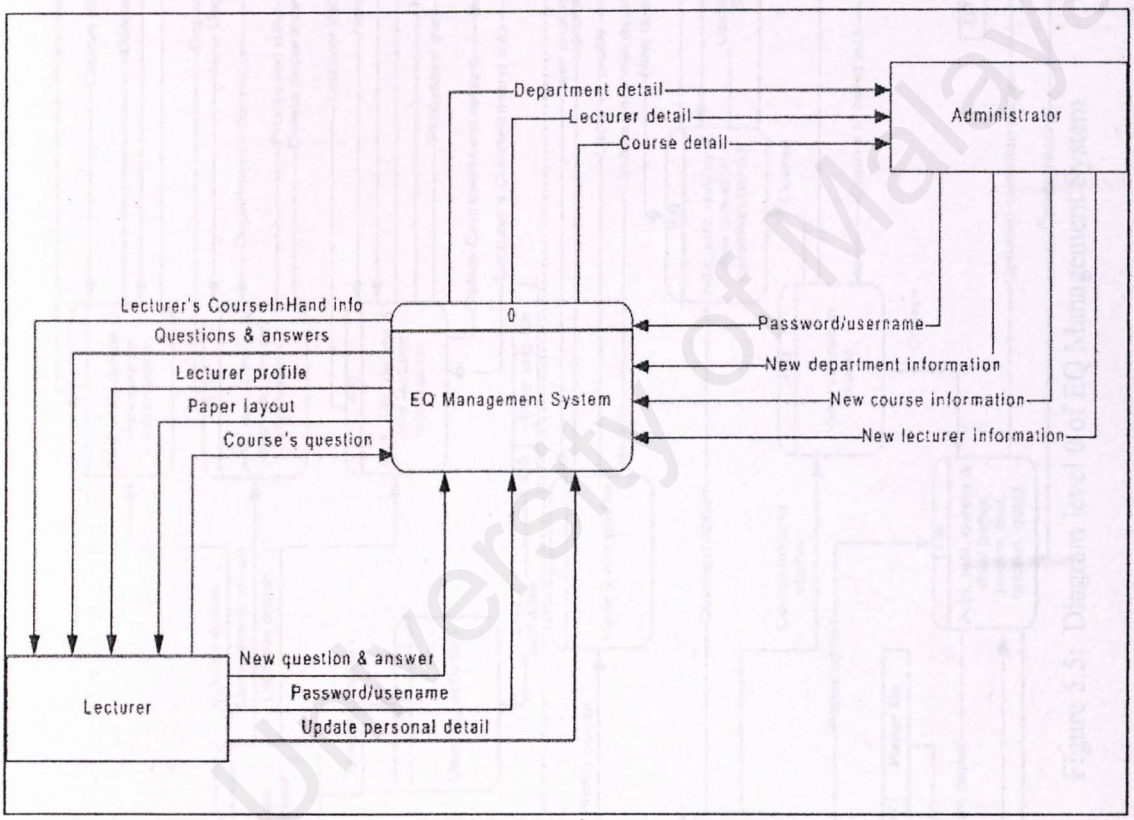


Figure 5.4: Context Diagram of EQ Management System

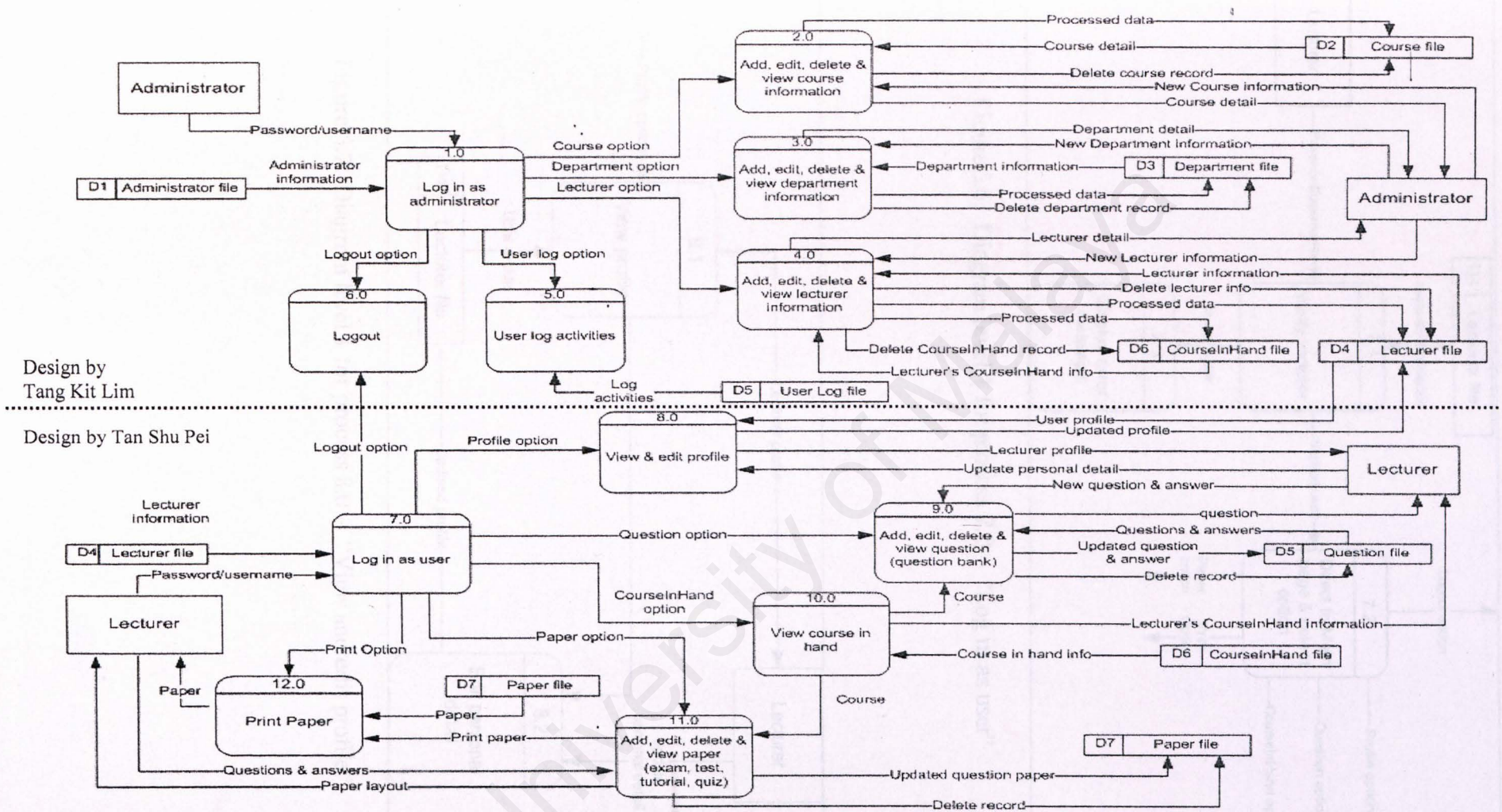


Figure 5.5: Diagram level 0 of EQ Management System

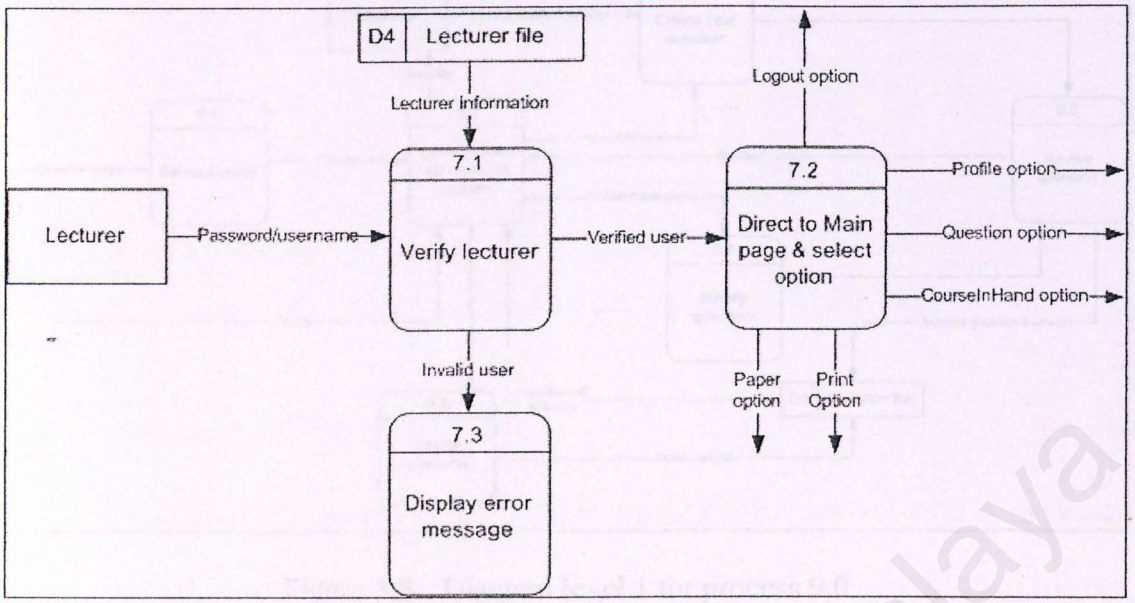


Figure 5.6: Diagram level 1 for process 7.0 – "Log in as user"

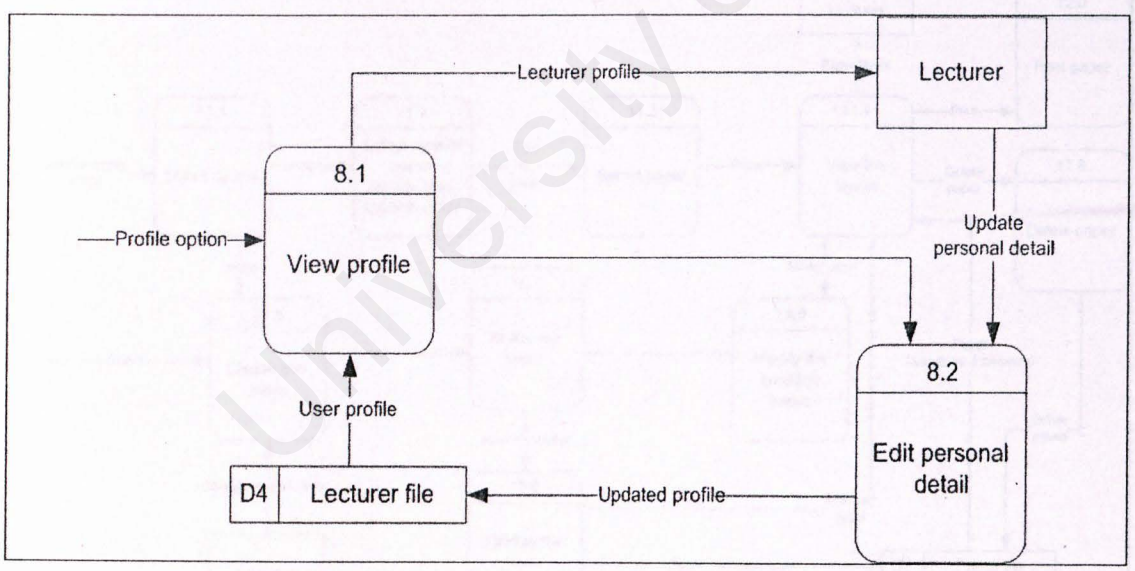


Figure 5.7: Diagram level 1 for process 8.0 – "View and edit profile"

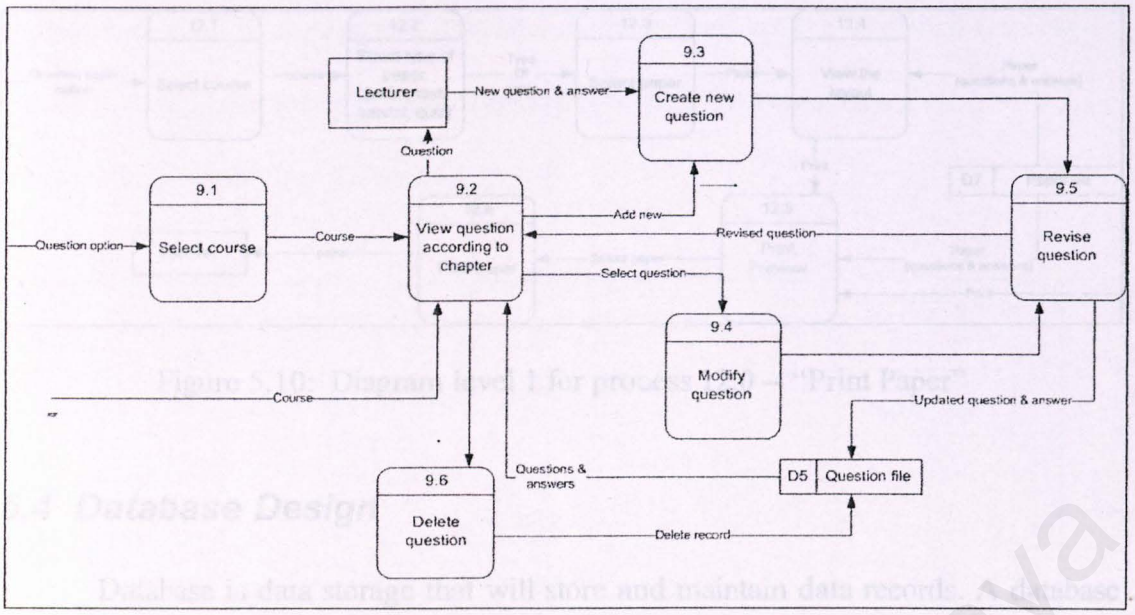


Figure 5.8: Diagram level 1 for process 9.0

"Add, edit, delete and view question (question bank)"

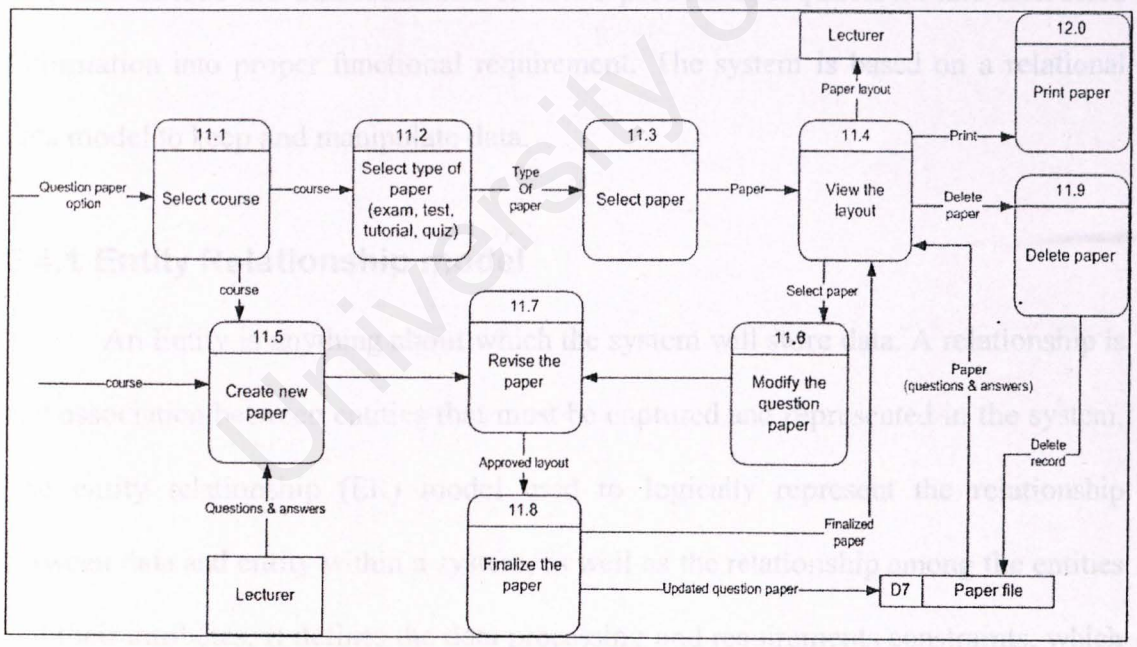


Figure 5.9: Diagram level 1 for process 11.0

"Add, edit, delete and view paper (exam, test, tutorial, quiz)"

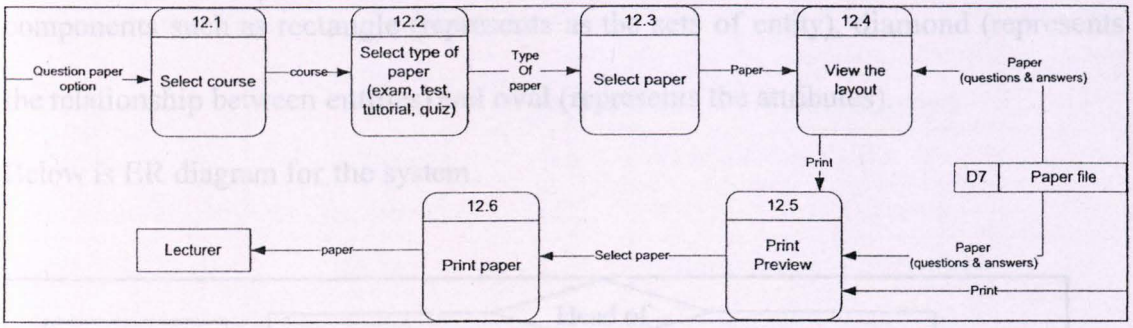


Figure 5.10: Diagram level 1 for process 12.0 -- "Print Paper"

5.4 Database Design

Database is data storage that will store and maintain data records. A database should be reliable and have high integrity to trust. It should provide for the efficient storage, update and retrieval of data.

Database design involves the activity on modelling the structure of database. It will also include the transformation of user's processing requirement and unordered information into proper functional requirement. The system is based on a relational data model to keep and manipulate data.

5.4.1 Entity Relationship model

An Entity is anything about which the system will store data. A relationship is any association between entities that must be captured and represented in the system. The entity relationship (ER) model used to logically represent the relationship between data and entity within a system, as well as the relationship among the entities and their attributes. It defines the data processing and requirements constraints, which is helpful in implementing the database and analyzing different view of data from different perspective.

Based on the ER model, ER diagram is created. An ER diagram is a graphical means of representing entities and their relationship. ER diagram consist several

components such as rectangle (represents as the sets of entity), diamond (represents the relationship between entities) and oval (represents the attributes).

Below is ER diagram for the system.

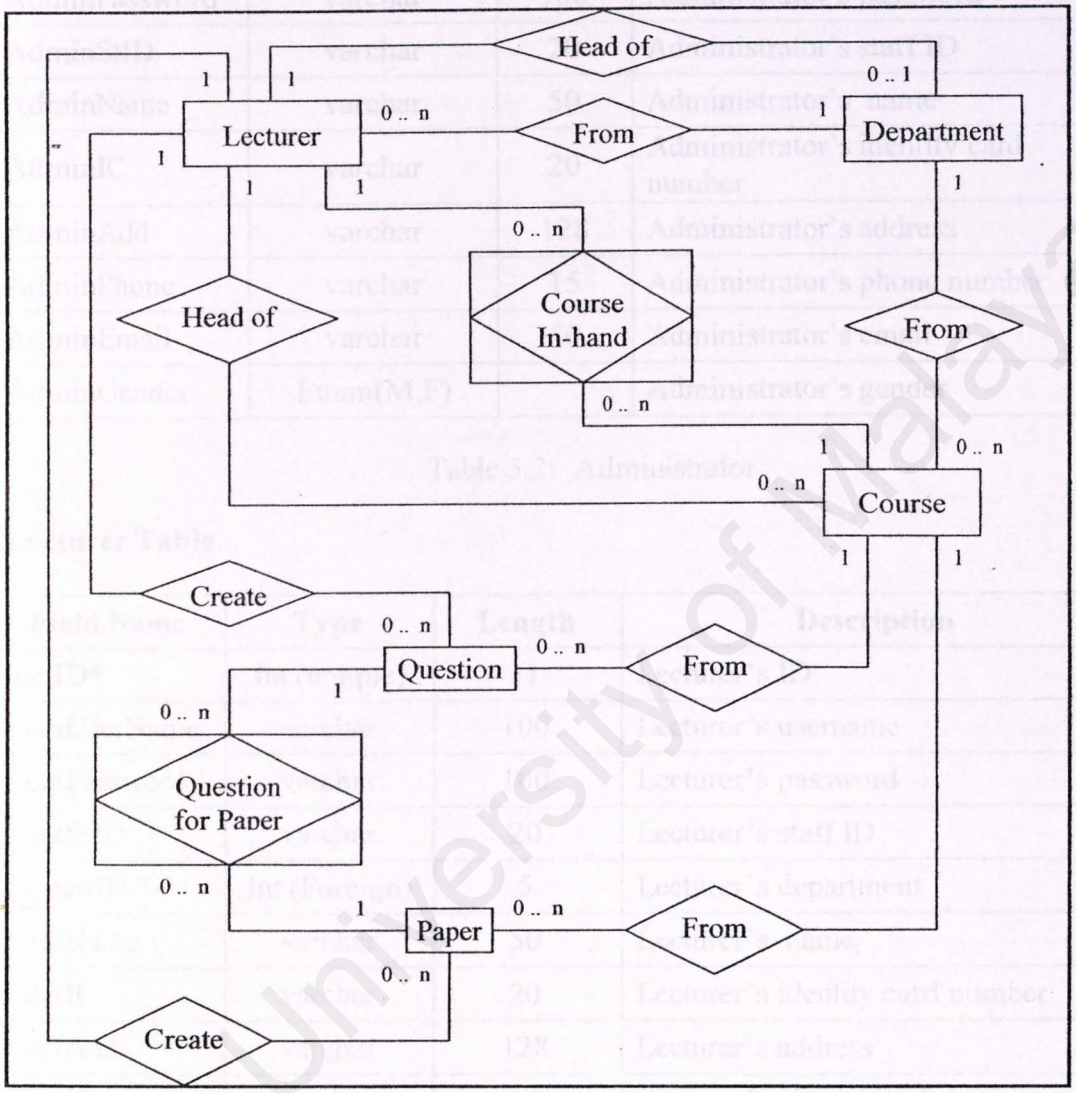


Figure 5.11: Database design for EQ Management System

5.4.2 Data Dictionary

Data dictionary can be defined as descriptions of the database structure and contents. Data dictionaries are lists of all of the names used in the system models. Descriptions of the entities, relationships and attributes are also included.

Administrator Table

Field Name	Type	Length	Description
AdminID*	Int (unique)	11	Administrator's ID
AdminUserName	varchar (unique)	100	Administrator's username
AdminPassword	varchar	100	Administrator's password
AdminStID	varchar	20	Administrator's staff ID
AdminName	varchar	50	Administrator's name
AdminIC	varchar	20	Administrator's identity card number
AdminAdd	varchar	128	Administrator's address
AdminPhone	varchar	15	Administrator's phone number
AdminEmail	varchar	50	Administrator's email
AdminGender	Enum(M,F)		Administrator's gender

Table 5.2: Administrator

Lecturer Table

Field Name	Type	Length	Description
lectID*	Int (unique)	11	Lecturer's ID
LectUserName	varchar	100	Lecturer's username
LectPassword	varchar	100	Lecturer's password
LectStID	varchar	20	Lecturer's staff ID
DepartID	Int (Foreign)	5	Lecturer's department
LectName	varchar	50	Lecturer's name
LectIC	varchar	20	Lecturer's identity card number
LectAdd	varchar	128	Lecturer's address
LectPhone	varchar	15	Lecturer's phone number
LectHP	varchar	15	Lecturer's handphone number
LectEmail	varchar	50	Lecturer's email
LectGender	Enum(M,F)		Lecturer's gender

Table 5.3: Lecturer information

Course Table

Field Name	Type	Length	Description
CourseID*	Int (unique)	11	Course's ID

CourseName	varchar	50	Course's name
CourseCode	varchar	10	Course code
CourseCH	int	2	Course's credit hour
CourseDesc	text		Course's description
DepartID	Int (foreign)	5	Course's department
LectID	Int (foreign)	11	Course's coordinator

Table 5.4: Course information

Question Table

Field Name	Type	Length	Description
QuestID*	Int (unique)	30	Question's ID
CourseID	Int (foreign)	11	Question's course
QuestChap	int	11	Question's chapter
QuestQ	Text (encrypt)		Question
QuestChA	Text (encrypt)		Question's choice A
QuestChB	Text (encrypt)		Question's choice B
QuestChC	Text (encrypt)		Question's choice C
QuestChD	Text (encrypt)		Question's choice D
QuestChE	Text (encrypt)		Question's choice E
QuestAns	Text (encrypt)		Question's answer
QuestQFigure	mediumblob		Location for Question's figure.
QuestChAFigure	mediumblob		Location for choice A's figure.
QuestChBFigure	mediumblob		Location for choice B's figure.
QuestChCFigure	mediumblob		Location for choice C's figure.
QuestChDFigure	mediumblob		Location for choice D's figure.
QuestChEFigure	mediumblob		Location for choice E's figure.
QuestAnsFigure	mediumblob		Location for answer's figure.
LectID	int (foriegn)	11	Question's founder

Table 5.5: Question

Paper Table

Field Name	Type	Length	Description
PaperID*	Int (unique)	30	Paper's ID
PaperName	varchar	100	Paper's name

PaperType	enum		Paper's type (Exam, test, quiz, tutorial,other)
PaperStatus	varchar	20	Paper's status (Finalize, Draft)
PaperCDate	datetime		Date created of paper
PaperLastMod	datetime	30	Date last modified of paper
CourseID	Int (foreign)	11	Paper's course
LectID	Int (foreign)	11	Paper's creator

Table 5.6: Paper

Paper_quest Table

Field Name	Type	Length	Description
PaperQuestID*	Int (unique)	30	Paper's question ID
PaperID	Int (foreign)	30	Paper's ID
QuestID	Int (foreign)	30	Question's ID
PaperQuestNo	varchar	5	Question's sequence in paper
PaperQuestSubNo	varchar	5	Question's sub sequence in paper
PaperQuestMark	double	5,2	Question's mark in paper

Table 5.7: Paper's Question

Department Table

Field Name	Type	Length	Description
DepartID*	Uniqueident	30	Department's ID
DepartName	Char	20	Department's Name
DepartDesc	char	20	Department's Description
LectID	int	11	Head of department

Table 5.8: Department information

CourseInHand Table

Field Name	Type	Length	Description
CourseInHandID*	Int (unique)	11	CourseInHand's ID
CourseID	Int (foreign)	11	Course's ID
LectID	Int (foreign)	11	Lecturer's ID

Table 5.9: Lecturer's course in hand information

Log Table

Field Name	Type	Length	Description
LogID*	Int (unique)	11	Log ID
LogDate	varchar	30	Log's Date
LogContent	text		Action taken by user
LectID	Int (foreign)	11	User ID
LogIP	varchar	20	IP of the computer that login to the system
LogType	int	11	Type of log (access, admin, error, lecturer)

Table 5.10: Log File

5.5 User Interface Design

User interface design is a very important part of a system as the interface of a system plays an important role in communicating between the processing functions and the users' request. It enables the users to grab the needed information and also provide a medium for user to apply more information to the system. User interface gives the site visitors the first impression of the site and also works as the direct interaction between the user and the system. Thus, the interface must be able to interact with the user so that the user can accept and adapt to the interface to perform task. In addition, the interface must be simple and consistent, providing an easy and fast data entry and retrieval.

5.5.1 Login

The login page allows user to enter their user ID, password and user type, either administrator or lecturer.

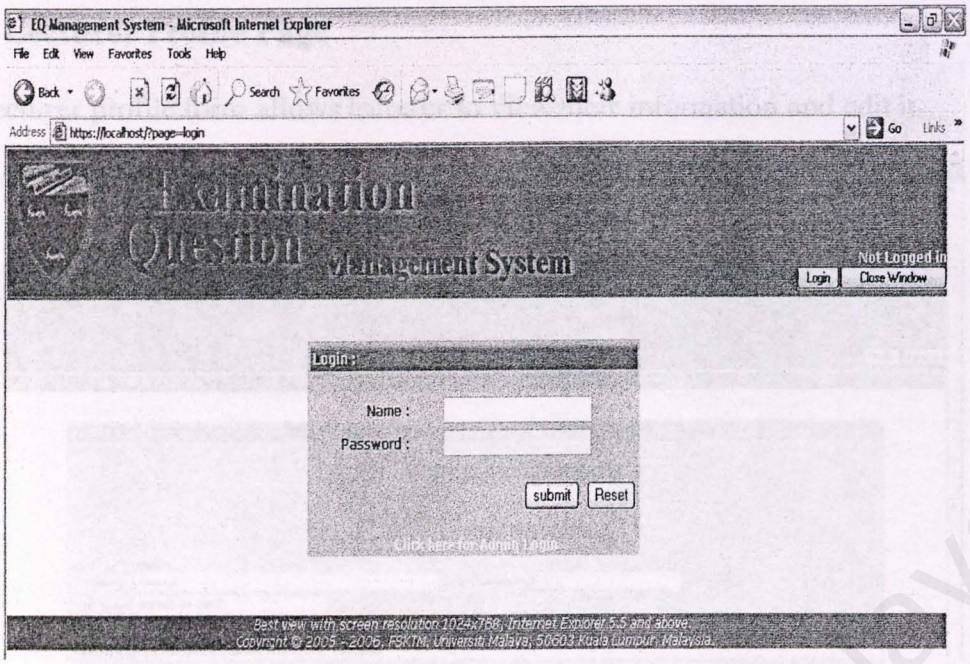


Figure 5.12: EQM System's Login Page

5.5.2 User Main page

If user login as lecturer, they can view their details, edit the profile, view, add or edit question and paper.

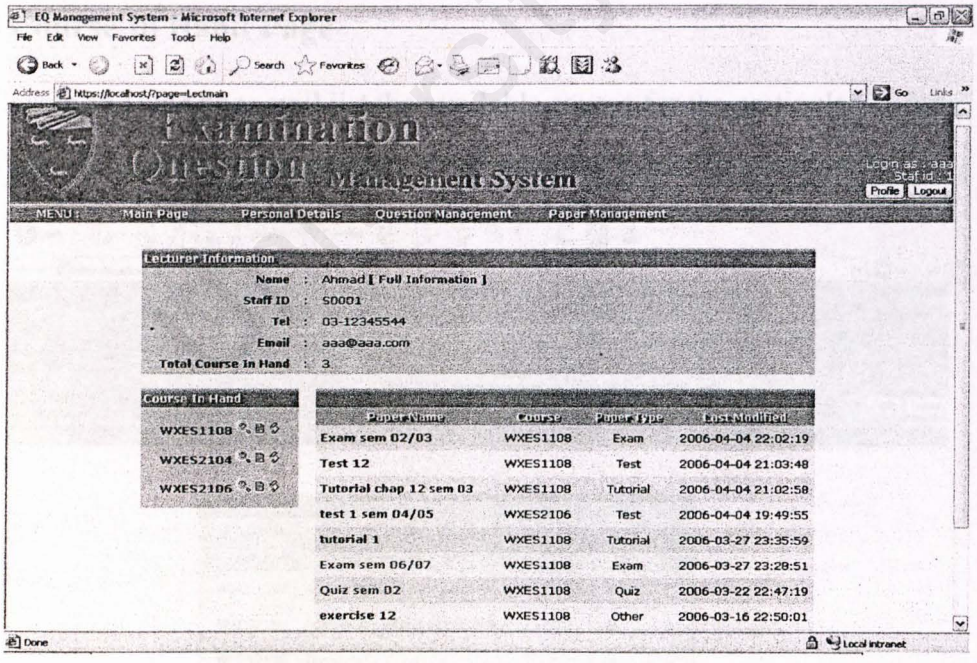


Figure 5.13: Main Page for EQM System

5.5.3 Lecturer Profile Page

The lecturer profile form allows lecturer to view their information and edit it.

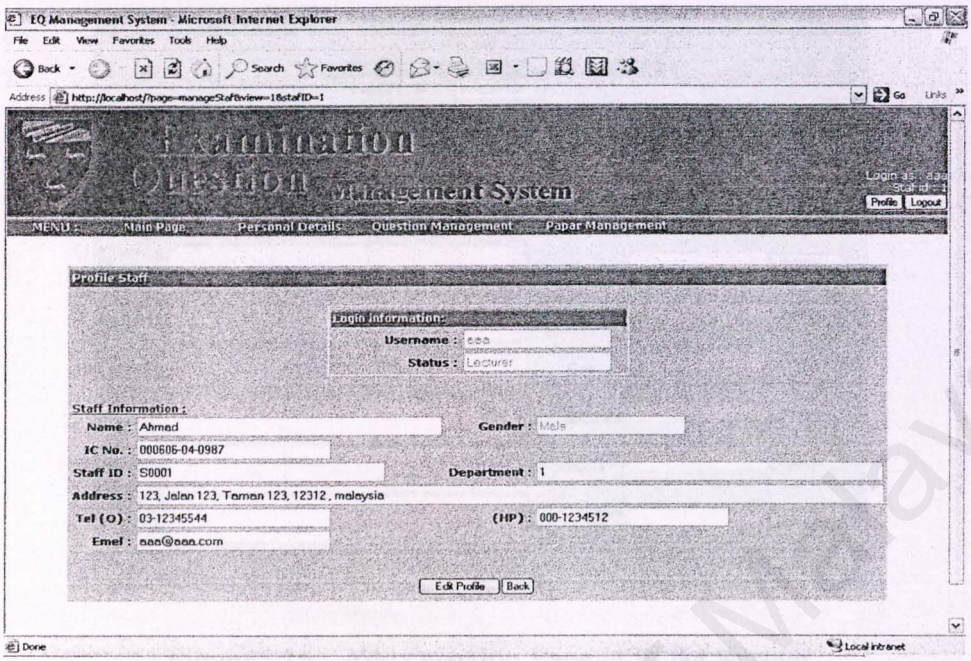


Figure 5.14: User Profile Page for EQM System

5.5.4 Course In Hand Page

The Course In Hand page will list the available course for the particular lecturer.

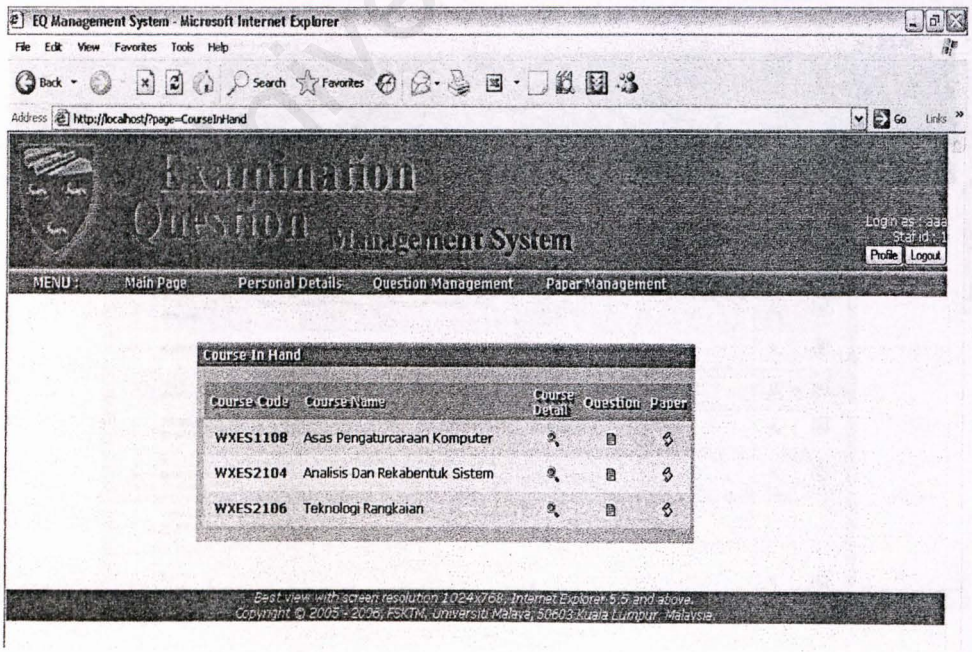


Figure 5.15: CourseInHand page of EQM System

5.5.5 Add Question

The add question form is used to create new question.

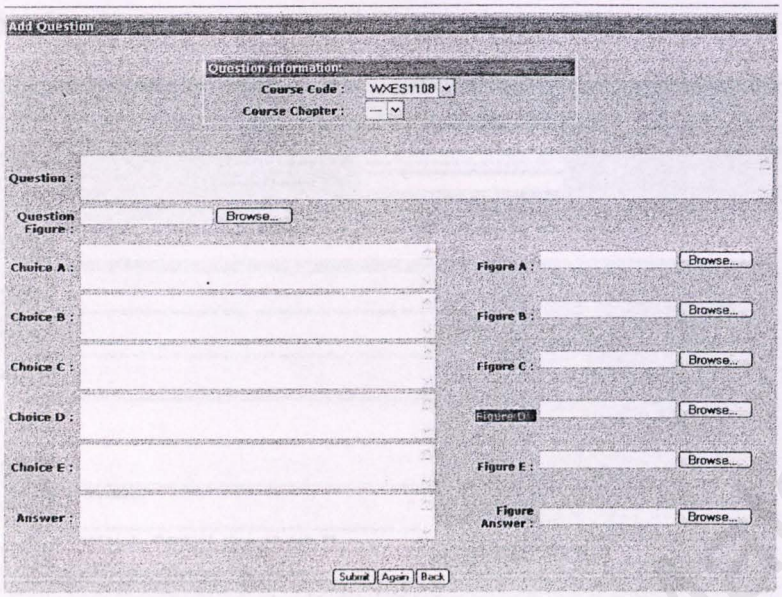


Figure 5.16: Add Question Page of EQM System

5.5.6 Question list

This page will list out all the question of particular course. It allow lecturer to view or delete question.

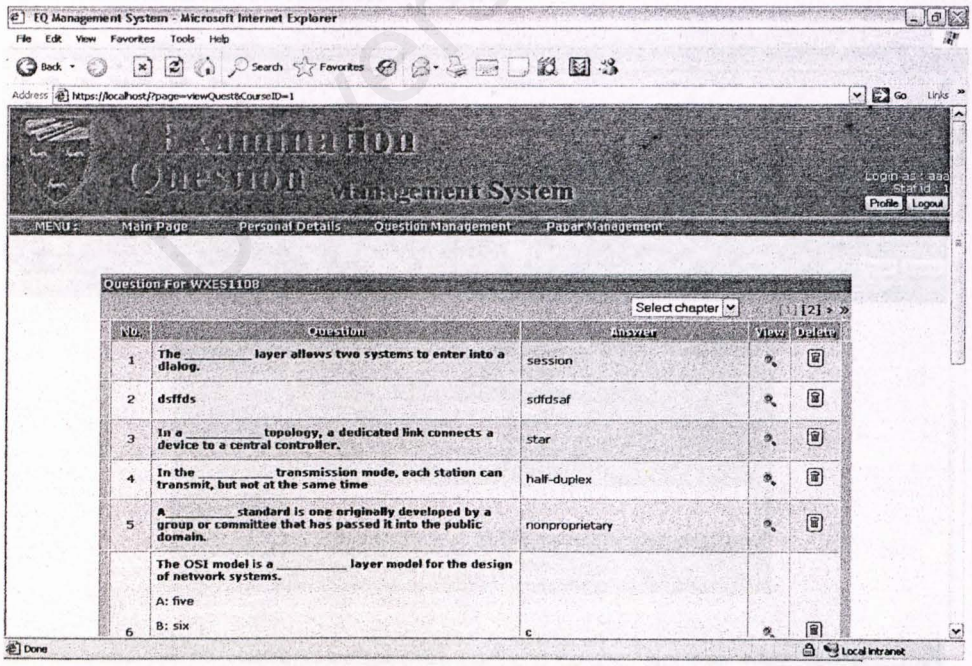


Figure 5.17: Question Page of EQM System

5.5.7 Question

The question page will show a question's information. It allow lecturer to view, edit or add question into paper.

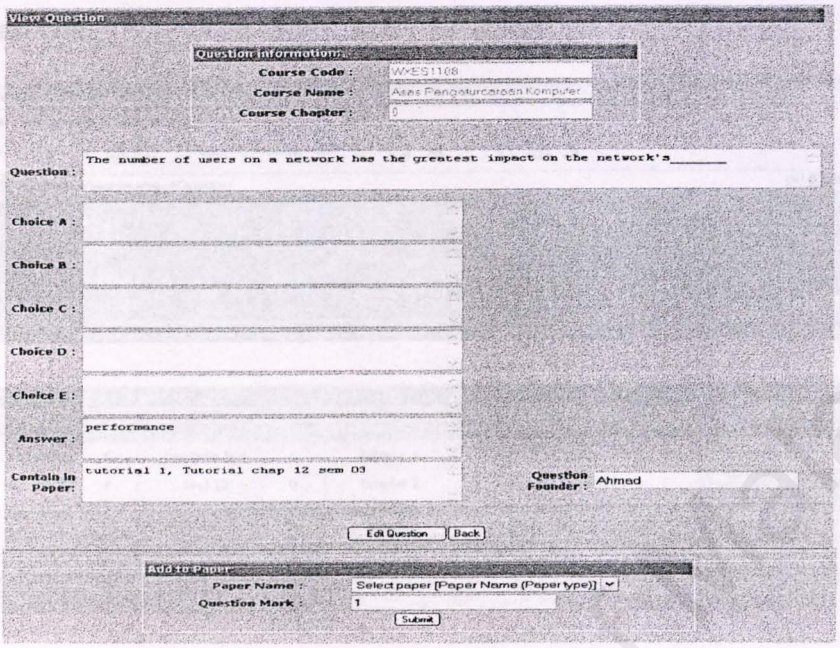


Figure 5.18: Question Page of EQM System

5.5.8 Add Paper

Add paper form is used to create new paper.

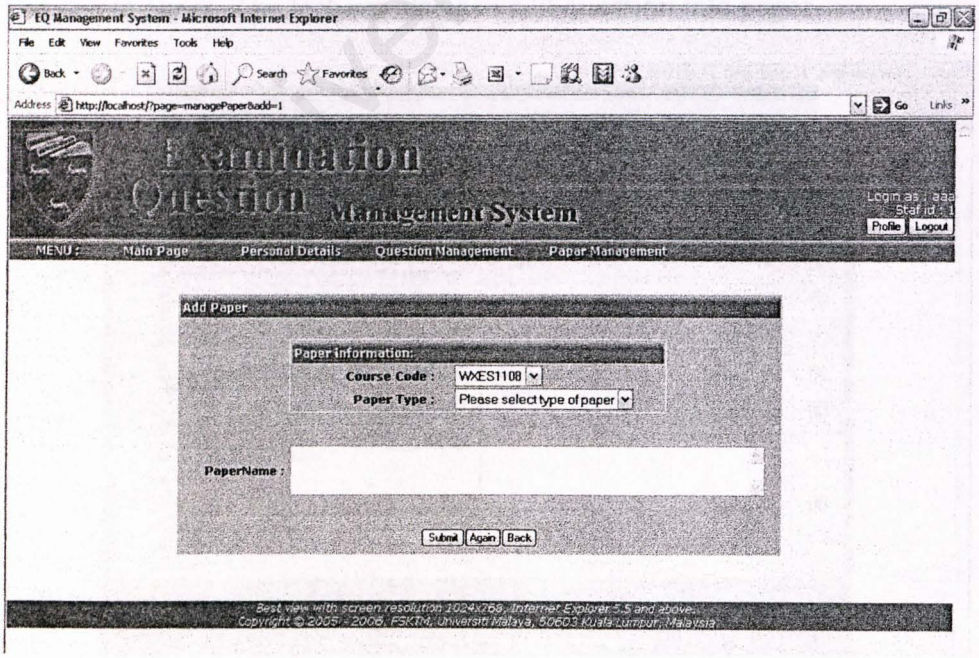


Figure 5.19: Add Paper Page of EQM System

5.5.9 Paper list

This page will list all the paper for a particular course. It will also show the status of paper, either finalized or draft. Finalized paper only for view, where as draft paper is for view and edit.

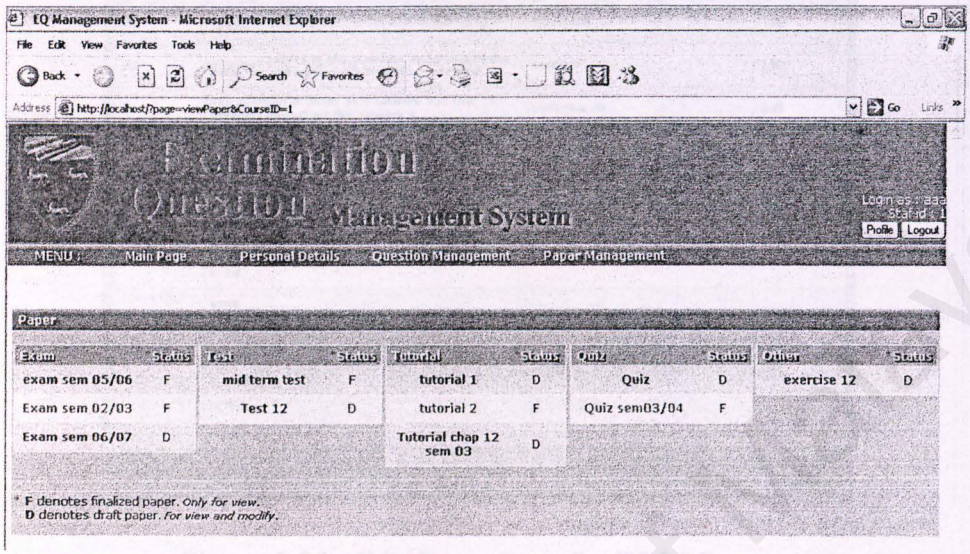


Figure 5.20: Paper List Page of EQM System

5.5.10 Paper

The paper page allow lecturer to view, edit (for draft paper), finalize (if it is draft paper) or delete paper. The lecturer also can add question into paper.

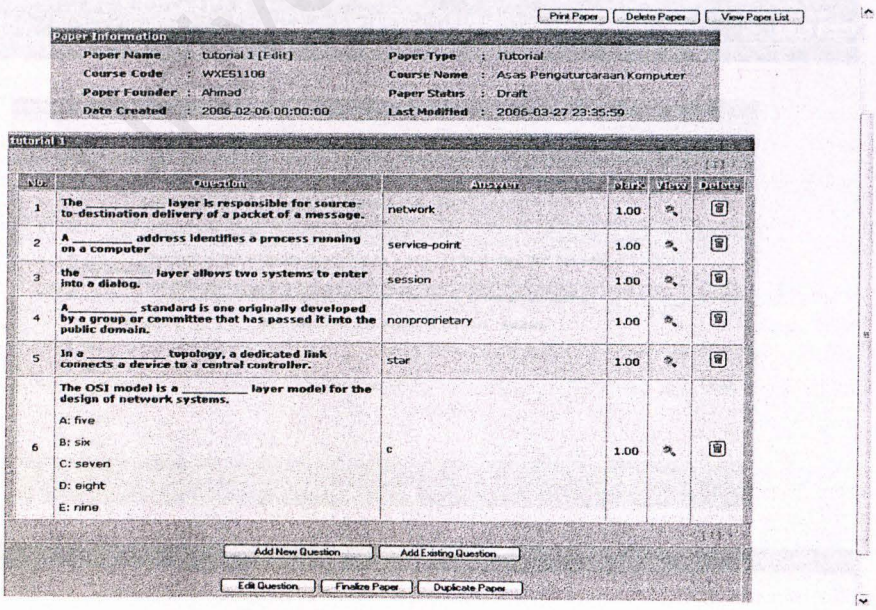


Figure 5.21: Paper Page of EQM System

5.5.11 Edit Question in Paper

This page is used for lecturer edit the sequence and mark in a paper.

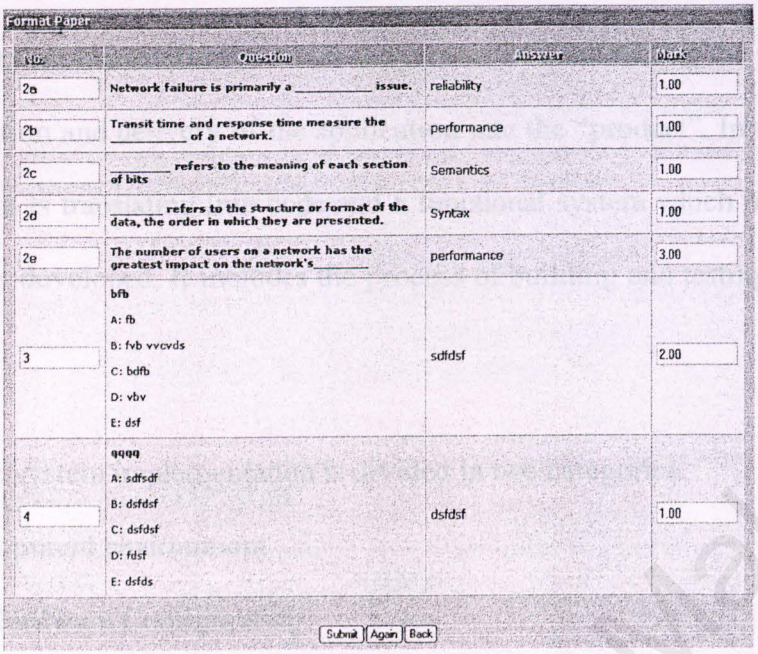


Figure 5.22: Edit Paper Page for EQM System

5.5.12 Print Paper

This page is used for list the questions in a paper in a print viewing.

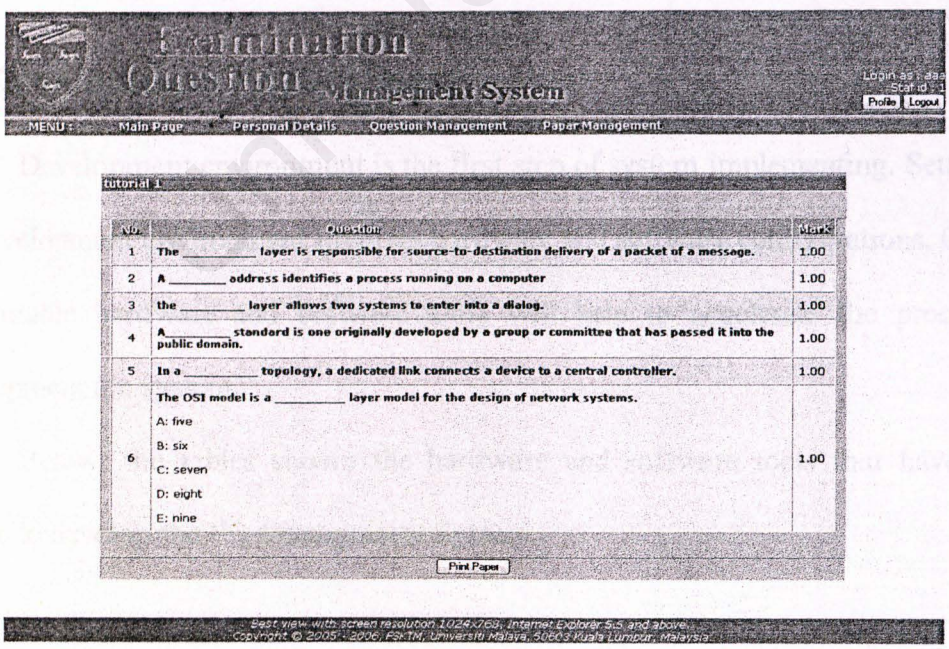


Figure 5.23: Print Paper Page

CHAPTER 6 SYSTEM IMPLEMENTATION

6.1 Introduction

System implementation involves the process of constructing the representation of the application and delivery of the application into the "product". In this phase, the detailed design is translating into code and a functional system which met the system requirement is developed. It includes the process of building and testing the system's modules.

Generally, the system implementation is divided in two categories:

I Development environment

i. Hardware Configuration

ii. Software Configuration

II Software Coding

i. Coding Approach

ii. Coding Principles

6.2 Development Environment

Development environment is the first step of system implementing. Setting up the development environment involves hardware and software configurations. Chosen the suitable hardware and software tools will help to accelerate the process of development the system.

Below, the tables shown the hardware and software tools that have been chosen to develop the EQ Management System.

6.2.1 Hardware Configuration

Hardware	Requirements
Processor	Intel Pentium 4 processor 1.40 GHz
Motherboard	PC Partner I845 chipset Main board
RAM	256MB Kingston SDRAM PC133MHZ
Hard disk	HDD 40.0GB Maxtor/Seagate 7200rpm HDD
Graphic Card	32MB NVIDIA TNT2 AGP
Other standard computer peripherals	52x 24x 52x CDRW 10/100MBPS Ethernet card 1.44MB Floppy Disk Drive Windows Compatible Keyboard and Mouse 15"Samsung Monitor

Figure 6.1: Hardware configuration

6.2.2 Software Configuration

Software	Purpose	Description
Microsoft Windows XP Professional	System Requirement	Operating System [Final Stage]
Apache HTTP Server 2.0.52	System Requirement	Web Server host [Final Stage]
PHP 5.0.3	System Development	Coding the web pages
Microsoft Internet Explorer 6.0 (IE 6.0)	System Development	Web Browser
MySQL 5.0.18	System Development	Database Design & Database Server
Macromedia Dreamweaver MX	System Development	
Adobe Photoshop	Interface Design	Image design and creation
Microsoft Visio 2003	System Design	Diagram Creation [Earlier and final stage]
Microsoft Word 2003	Documentation	System Documentation [Earlier and final stage]

Figure 6.2: Software configuration

6.3 System Coding

Beside of development environment, the system implementation also includes software coding. The software coding involves the process of converting the system

requirements into codes and translating a design into a program by programming and coding procedures.

6.3.1 Coding Approach

There are two types of coding approach, top-down and bottom-up. The top-down approaches is based on the design begins by specifying complex pieces and then dividing them into sequentially smaller pieces. Ultimately, the components are specific enough to be coded and the program is written. The bottom-up approach is opposite of the top-down approach. It is refers to a style where an application is built starting with simpler functions, and constructing gradually more and more complicated features, until the all of the application has been written.

The EQ Management System was developed using the bottom-up approach. Each simpler function and procedure was developed individually and then integrated them into complicated modules accordingly. Bottom-up approach offers some advantages such as:

i. Critical functions can be coded initially to test their efficiency.

ii. Increase the development process as the primitive modules or functions can be built independently and simultaneously without waiting or delaying the others.

iii. Testing can be conduct on some of the modules while the others are still under construction.

iv. Faults are easier to be detected.

6.3.2 Coding Style

Coding style is an attribute of source code that determines the comprehensibly, readability and maintainability of program. The maintenance and enhancement will be

easier to implement if the source code is simple and easy to read. The coding style includes internal documentation which is resided in the source code, methods for data declaration and approach to statement construction.

Typically, there is some condition to be fulfill, intent to have a good coding practices. Firstly, indent coding should be applied by formatting and indenting the codes. This will make the error and faulty easier to be found and detected. Furthermore, the indented code is easier to read and this is useful while it is involves a lot of conditional structure and loop structure. Secondly, layout the program source code such as begin a new line for each sentence, indent the statement following control structure, using white space to distinguish related blocks of code and so forth. This will helps to improve the program readability. Thirdly, to lessen the use of comments, use a consistent and meaningful variables name. Lastly, write the description and comments in the source codes.

i. PHP Script

A PHP script is a simple text file which the web server sends to an interpreter: the PHP engine. For a file to be recognized as PHP script, it must show an appropriate extension: ".PHP".

All PHP codes must start with the ***<?php*** tag and finish with ***?>***. All content located outside these two tags is sent back to the browser without being interpreted by the PHP engine. This structure allows combining PHP code sections, which handle the dynamic content, with regular, static HTML elements. This is the same principle used in the JavaScript code delineated by ***<script>*** and ***</script>*** tags.

ii. PHP's MySQL connection File

Below is an example codes taken from the project file name "dbconnect.php".

```
<?php
        // Connect to MySQL
        $db = mysql_connect("localhost", "root","password");
        if(!$db)
        {
                $_SESSION['error']=1;
                header("Location: ../include/error.php");
        }
        else
        {
                // Select database on MySQL server
                $selected = mysql_select_db("eqm",$db);
        }
?>
```

Figure 6.3: A PHP Code for database connection—"dbconnect.php"

iii. SQL query File

SQL query is using to retrieve data from database or insert data into database.

Below are examples of SQL statement:

- SELECT [columns] FROM [tablename] WHERE [conditions]
  - The database will retrieve the values for the '*columns*' columns in the '*tablename*' table where the '*conditions*' conditions is met.
- INSERT INTO [tablename] ([column1], [column2]) VALUES ([value1], [value2])
  - The database engine will insert a new row into '*tablename*' table, using the '*value1*' and '*value2*' values for the '*column1*' and '*column2*' columns, respectively.

Below is an example taken from the project file name "courseInfo.php".

```
<?php
        //for display selected course information

        include_once 'include\dbconnect.php';

        // get the parameter passed
        $CourseID=$_GET["CourseID"];
```

```
include_once 'include\check.php';      //check the user authorization

$result=mysql_query("select * from course where CourseID = '$CourseID' ", $db);
$c_name=mysql_result($result, 0, "CourseName");
$c_code=mysql_result($result, 0, "CourseCode");
$c_ch=mysql_result($result, 0, "CourseCH");
$c_desc=mysql_result($result, 0, "CourseDesc");
$c_depart_tel=mysql_result($result, 0, "DepartID");
$c_Lect=mysql_result($result, 0, "LectID");

$result1=mysql_query("  select CourseInHandID, cih.CourseID, CourseName,
        CourseCode FROM course c, courseinhand cih where cih.LectID = '$s_id' AND
        c.CourseID=cih.CourseID ORDER BY CourseCode", $db);

?>
```

Figure 6.4: Part of the PHP code in "courseInfo.php"

iv. Include File

The include function enables to copy the contents of the file whose URL is passed as an argument, into the page. By insert this line in the page, it can make use of the personal functions library.

Below is an example taken from the project file name "display.php".

```
<?php
        // to display picture

        include 'include\dbconnect.php';

        $QuestID=$_GET["id"];
        $Figure=$_GET["pic"];

        $result=mysql_query("select * from question where QuestID = '$QuestID' ", $db);
        $Figure=mysql_result($result, 0, $Figure);


?>

<img src="upload/<?php echo "$Figure"; ?>" >?>
```

Figure 6.5: PHP code for display the image—"display.php"

v. Scripting Language

Scripting language used for EQM System is Javascript. Same as ASP, PHP also allows for HTML and a scripting language to be interspersed in a web page.

Below is an example of code that jump between HTML, PHP and Javascript.

```
<?php //include_once session.php ?>

<html>
<head>
        <title>EQ Management System</title>
        <meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
        <link rel="stylesheet" type="text/css" href="css/myCSS.css">
   <link rel="stylesheet" type="text/css" href="js/calender/skins/aqua.css">
        <script type="text/javascript" src="js/menu.js"></script>
        <script type="text/javascript" src="js/other.js"></script>
        <script type="text/javascript" src="js/calender/calendar.js"></script>
        <script type="text/javascript" src="js/calender/calendar-setup.js"></script>
        <script type="text/javascript" src="js/calender/calendar-en.js"></script>
</head>

<body onload="menuInit()"><div id="menu"><center>
<table width=100% border="0" cellpadding="0" cellspacing="0" align="center">
<tr>
<td align="left" width=* height="100" nowrap class="banner">
        <img src="image/banner.png" width="662" height="121">
</td>
<td align="right" valign="bottom" nowrap class="banner">
<?php if($s_id){
echo "<font color=\"FFFFFF\">Login as : $s_name<br> Staf id : $s_id<br></font>";      ?>
<sup>
        <button onClick="window.navigate('?page=manageStaf&view=1&stafID=<?
echo"$s_id"; ?>')" title="View Profile">Profile</button>
        <button onClick="return confirmSubmit()">Logout</button>
</sup>
<? } else {?>
<font color="FFFFFF"><b>Not Logged in</B><br>
<sup>
        <button onClick="window.navigate('?page=login')"> Login </button>
        <button onClick="window.close()"> Close Window </button>
</sup>
<? }?>
</td>
</tr>
<tr>
<td colspan="2" class="banner">
<table width=100% border="0" cellpadding="0" cellspacing="0" align="center" style="border: 0px">
<? if($s_id) { ?> <!-- menu -->
<tr bgcolor="#6699EE">
<?php      if   ($_SESSION['stafStatus']==1)   {include   'include/menu.php';}   else   {include
'include/Lectmenu.php';} ?>
</tr>
<? } ?>
</table>
</td>
</tr>
<tr><td colspan="2" class="displayPage">
        <br><br>
```

Figure 6.6: Code jump between HTML, PHP and Java Script--"Header.php"

6.3.3 Integration

Since the system consists of several modules and sub system, the integration is needed to combine all of them into a whole and complete system. Some of the actions, such as matching the font size and color, background color and add in related hyperlink, have been taken while integrating the design of each module. The integration must be applied on those pages without influence the system operation.

6.4 Coding Principles

During the development of system, there are some principles to be followed. It is to ensure good quality and the proper structure in the code generation. The principles will be discussed are reusability, readability and robustness.

i. Reusability

This system is emphasis on reusability which helps to improve product quality throughout the software development process. Pieces of programs written bottom-up tend to be more general, and thus more reusable. Reuse refers to code that is reused without change and has to be adapted to integrate it with new code. Components that designed to be reused in subsequent applications are created. In this system, some coding block that is reused in other program code is created, such as header and footer code of every web page file.

ii. Readability

Codes are wrote and formatted with readability so that it is easy to trace by other developer for error checking or the system enhancement in the future. Consistent and meaningful variables names, description and comments in the source

codes, proper identification and begin a new line for each sentence will helps to improve and preserve the readability of codes.

iii. Robustness

Robustness is capability of a system to handle an unexpected error and echo back with appropriate responses. A system should included error handling to increase the robustness. The system also has the ability to validate systems input to ensure the inserted data is correct so that the system integrity is protected. A proper error message will be displayed as response to user's input. Besides that, database will also be back-up automatically for restore purpose when there is some unplanned system interruption occurs.

CHAPTER 7 SYSTEM TESTING

7.1 Introduction

System testing is an integral component of the software process and an activity that must be carried out throughout the life cycle. The main function of testing is to discover the defects in a program where the behaviour of the program is incorrect, undesirable or does not conform to its specification, and to judge whether the program is usable in real application. Besides, testing also use to demonstrate that software functions appear to be working according to specification, and to demonstrate that behavioral and performance requirements appear to have been meet.

However, testing only demonstrate the presence of errors and does not show that there is no error in the program. Overall, the goal of testing is to convince the system developers and users that the software is good enough for operational use. [Sommoville, Page 539].

7.2 Type of faults

It is important to learn some type of faults since it may be detected during the process of system testing.

- Algorithmic fault

  Algorithmic fault is the condition where the system does not produce the expected and correct output for an input. This fault is occurred usually due to the mistake made during the program design process. This can be easily detected by going through line by line of the program code.

- Document Fault

Usually, documentation is derived from the system design and provides a clear description about the program. While the documentation is not match with the real application, and this is known as documentation fault. Due to this wrong implementation, it may lead to other faults later.

- Syntax Fault

  This is the fault where the construction of the language is improper. Syntax fault can be checked while parsing for algorithmic faults.

7.3 Testing Process

In generally, the testing of this project is begin at the unit level and then combining the units into sub-system and system, and each interactions of these units were tested. Different testing techniques are appropriate at different points in time.

7.3.1 Types of testing

There are 4 types of testing strategies is used. There are unit testing, module testing, integration testing and system testing.

7.3.1.1 Unit testing

Unit testing is an automated technique whereby each unit is tested alone in an attempt to discover any errors that may exist in the code. Unit test is performed concurrently with the development process.

Steps that are carried out during the unit testing of EQM System are as follows:

- Control objects are tested to ensure its functionality.
- Test cases are developed to ensure that the output of an input is produced as expected and correct.

- ❖ Different type of data is used to test the error handling function.
- ❖ Codes are reviewed line by line to discover any syntax error as well as semantic error. If errors are discovered, they are corrected immediately.

7.3.1.2 Module Testing

A module consists of a collection of dependent components to perform a particular task or function. Testing on this module is to ensure that the module calling sequence in this project is systematic and verify the correctness of the flows of events. Thus, while the system development process is being carried out module by module, the module testing will also be carried out once a module has been completed. Different possible test cases are applied to the module and the test results would be verified. If there is any incorrect in output, the unusual results will be analyzed.

7.3.1.3 Integration Testing

Combining modules and testing them is called integration testing. The integration testing will verify the system components are work together as describe in the system and program design specification. The main focus in integration test is to navigate the interfaces repeatedly to detect any interface mismatch problem. The test is conducted on the interface of two interactive components in a single unit and the process of two interface components in the system will be examined. This procedure is continuing until the entire program has been tested as unit.

7.3.1.4 System Testing

Instead of integrating modules into programs for testing, system testing is integrating programs into system. The objective of system testing is to find errors that

result form unanticipated interactions between sub-system and verify that whether the system meets the specified requirements.

There are several types of system testing is performed to worthwhile the system. There are:

- Function testing

  Function testing is performed to compare the integrated modules with the system's function requirements. Each module involved is tested individually to determine whether the system performs as required.

- Performance Testing

  Performance testing is performed to test the run-time performance of software within the context of an integrated system.

- Security Testing

  Security testing is performed to verify that protection mechanism built in the system that protects it from penetration.

CHAPTER 8 SYSTEM EVALUATION

8.1 Introduction

System evaluation is related to user environment, attitudes, information priorities and other concern that are to need to be considered carefully before effectiveness can be concluded. Evaluation is a process that occurs continuously for all phases of the system approaches and drawing on a variety of sources and information.

8.2 Problems and Solutions

i. Difficulty in choosing suitable Development technology, programming language and tools

There are many software tools is available to develop EQ Management System. It is hard to choose a suitable technology and tools as all the tools have their own strengths and weaknesses.

To solve this problem, I have discussed with my project partner. Finally, we have chosen Apache Server as web server, MySQL as database server and PHP as programming language since they are free of charge to use. And the Apache/PHP/MySQL trio forms are one of the most popular professional web platforms in the world.

ii. Lack of Knowledge in PHP and JavaScript

These programming languages and concepts never learned before. Due to lack of this knowledge, I was uncertainly on how to organize the codes to produces a web-based system.

To overcome this problem, I try to pick up some good habits right to learn the syntax and structures of language, and gone through some online tutorial. Besides, I able to found some good help on the net to solve most of the problem faced. Discussion with project partner also a great help since he is more knowledgeably in PHP. And the most efficient method is through trail and error during the coding phase.

iii. Lack of hardware and Software Configuration Knowledge

The environment between software and hardware, and software and software need to be configured before the start of the development phase, such as the directory root of the web server need to be change to our own directory, configure PHP for Apache, configure PHP with MySQL and so forth. Since I don't have any knowledge about Apache/PHP/MySQL, it is hard for me to do so. Yet, it is very luckily that while I'm taken the WMES3314 Electronic Commerce Course, Ms. Chew Esyin have taught same basic thing about Apache/PHP/MySQL, and how to install and configure those application. So now, I'm able to make Apache/PHP/MySQL to work well together.

8.3 System Strengths

i. Provide a Question Bank

All the exam questions can store in the database and retrieve from the database. Lecturer can add question into the database, delete question from database, edit and view the question according to their capable access of course. And paper can be easily created by select the question from question bank.

ii. Exam Editor

Lecturer can create new exam paper, tutorial, test and quiz from an existing questions in the database or manually add the question. The created paper can be share among the lecturers.

iii. Effective restriction on capability access of lecturer towards course

System administrator can restrict the lecturer's access towards courses by assigning the course to lecturer.

Lecturer only can access the designated course in order to create, delete, edit and delete question or paper.

iv. Printing Hall

Lecturer can preview the question paper on screen or print out the exam, test, tutorial and quiz paper that have been created.

8.4 System Constraints and Future Enhancements

EQM System is still not delicate enough to work at its full efficiency. Some improvement and enhancement needs to be applied to the system to increase it usability and reliability.

i. Lack Interaction among lecture

The system is lack of interaction among lecturer. Lecturer cannot communicate and have a discussion within the system. To improve this limitation, the system may provide the message service, which allows the lecturer to send and receive message to particular lecturer, or chat room, which will allow lecturer have an online discussion within the system.

ii. No Import Question from File Function

The system does not provide the function that import question from file. This function should include in futures because it will ease the lecturer's work instead of key in the question one by one manually.

iii. Security Issue towards the Confidential Data

At the meanwhile, the security method apply in this system is encryption of data in the database layer and the Secure Sockets Layer (SSL). Since the technology is grown fast and the penetrate technique is progressive change, the security issue also must be enhance from time to time.

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Apache Web Server: http://www.apache.org

mod_ssl: http://www.modssl.org

MySQL: http://www.mysql.com

PHP Hypertext preprocessor: http://www.php.net

PHP Manual: http://us2.php.net/manual/en/index.php

http://www.phphelp.com/

http://www.w3schools.com/php/default.asp

http://www.visualdesigncore.com/tutorials/PHP-MySQL

http://www.programmingtalk.com/archive/index.php/f-121.html

http://www.php.net/manual/en/ref.mysql.php

http://my.php.net/manual/en/index.php

http://www.php-mysql-tutorial.com/index.php

http://www.phpfreaks.com/

http://www.phpriot.com/d/articles/php/index.html

http://www.onlinesupport.interland.net/freedom/guide/mysql.htm

APPENDIX

User Manual

Introduction

Exam Question Management System (EQMS) is a web-based system that provides a secure database to ease the lecturer in managing the exam, test, quiz and tutorial question while maintaining high security. This manual is a guide to help user to using EQM System effectively.

This manual is divided mainly into two parts, which are System Administrator section and Lecturer Section.

A. Lecturer Section

1. Login

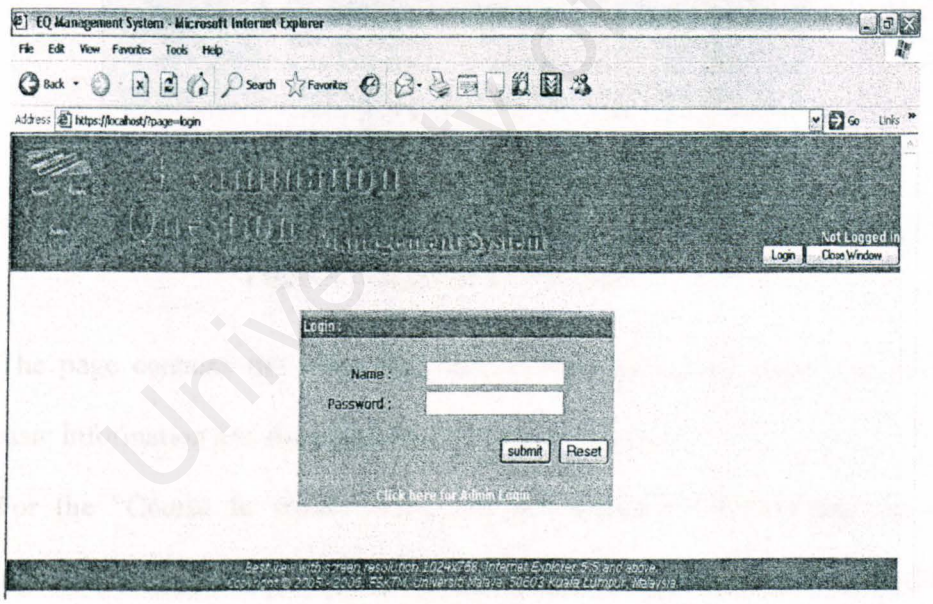

Figure 1: Login Page

i. Key in the Username and Password in corresponding textboxes, and select the type of user, whether Admin or Lecturer, as shown in the Figure 1.

ii. Click Submit button. The system will validate the username and password according to the user type. If the user is authenticated, the system will direct to the main page (see Figure 2). Else the error message will be shown.

2. Main Page

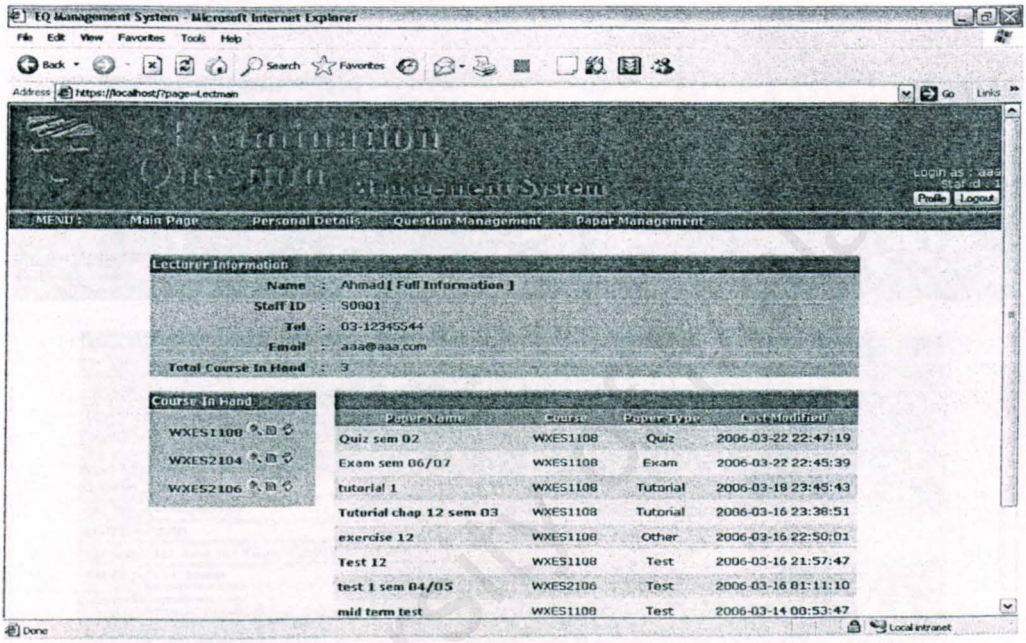

Figure 2: Lecturer's Main page

The page contains the menu that link to other functional page. The page also shows basic information and the course in hand for the lecturer.

For the "Course In Hand" table, the first button is for viewing the course information, the second button is for viewing the course's questions, and the third button is for viewing the course's paper list.

At the bottom right of page, there will be a table showing the 10 most updated paper. By clicking the paper name, the system will display the selected paper page. For more information, see ***Paper Page*** on page 13.

3. Personal Detail Management

3.1 View and edit profile

i. From the "Personal Detail" in the menu, click "Profile" to view the profile.

A form as in Figure 3 will appear. This page is for viewing only.

ii. For edit profile, click the "Edit Profile" button at the bottom of page.

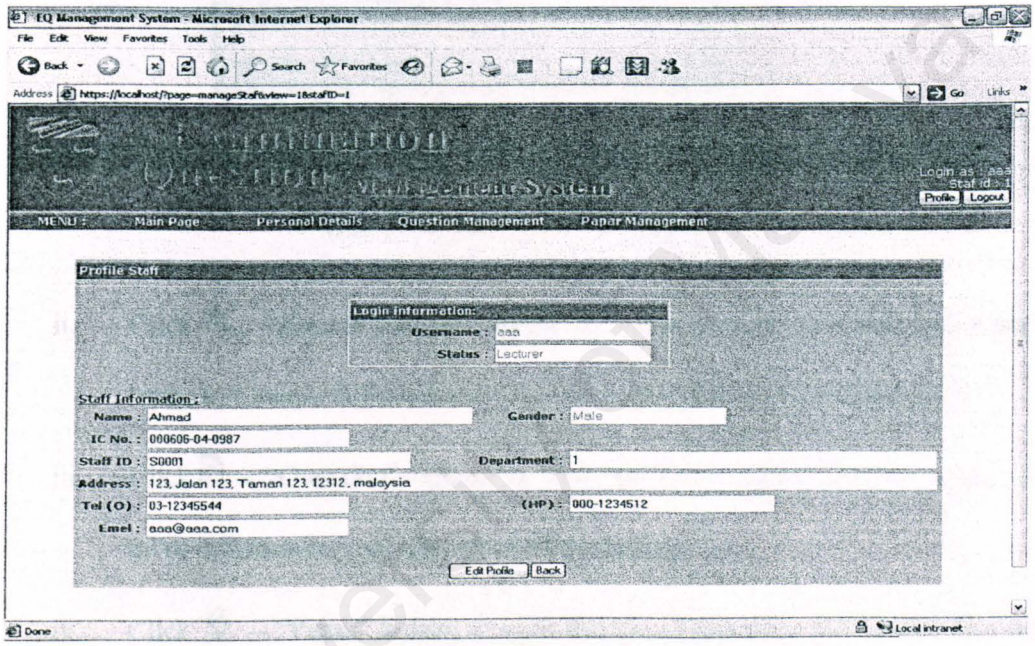

Figure 3: Profile Page for viewing

NOTE: You also can view your file by clicking the "Profile" button at the top right corner of page or click at the "Full Information" link at the Lecturer Information table while in the main page.

3.2 View Course In Hand

i. Click "Course In Hand" in the "Personal Details" Menu. A page as in Figure 4 will be display.

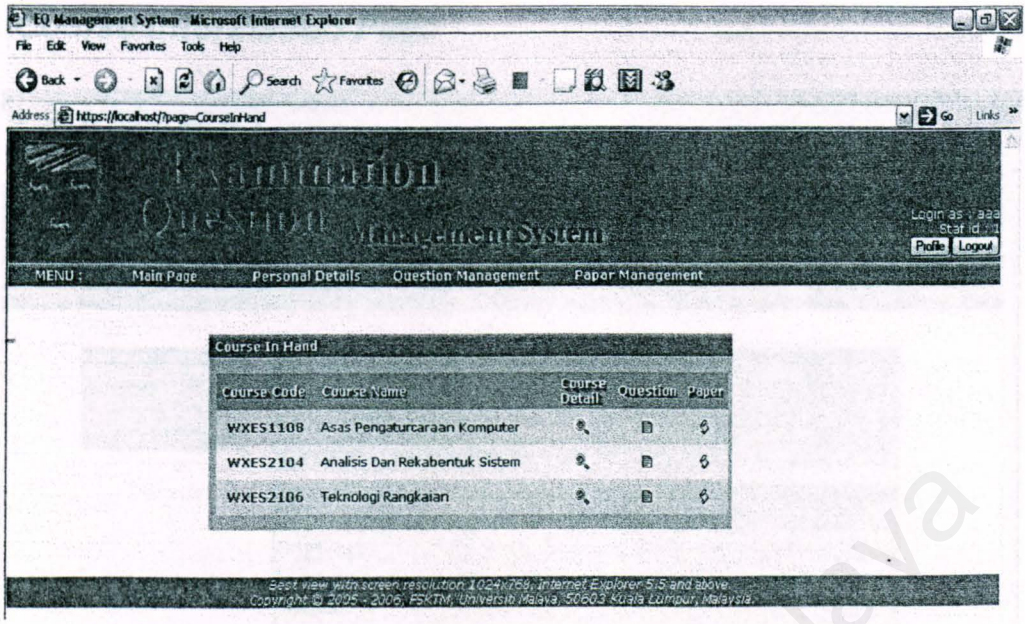

Figure 4: Course In Hand Page

ii. Click , "Course Detail" button to view particular course information (refer to ***Course Information Page*** on page 5 for more information).

iii. Click -- "Question" button to view all the questions for the course. For more information, see ***Question Page*** on page 7.

iv. Click -- "Paper" button to view the list of paper for the course. For more information, see ***Paper Management*** on page 9.

4. Course Information Page

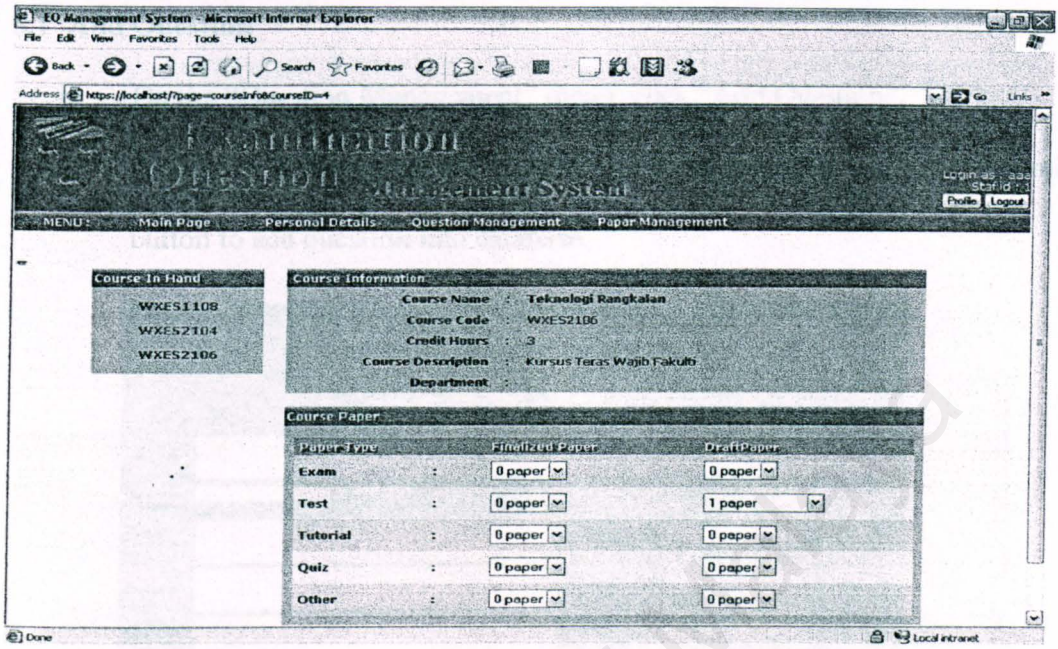

Figure 5: Course Information Page

This page will display the information of a course, such as the course name, course's credit hours, course description and department.

The left table, "Course In Hand" table, will list the course in hand for the lecturer. Click on the course code, will display the selected course information.

The bottom right table, "Course Paper" table, shows the number of paper categorized by paper's type and paper's status. For more information about the paper's type and paper's status, see ***Paper Management*** on page 9.

Select the paper from the drop down list, will definitely direct to the selected paper page.

5. Question Management

5.1 Add Question

i. On the "Question Management" menu, click "Add Question".

ii. A form as in Figure 6 will appear. Fill in the question and click "submit" button to add question into database.

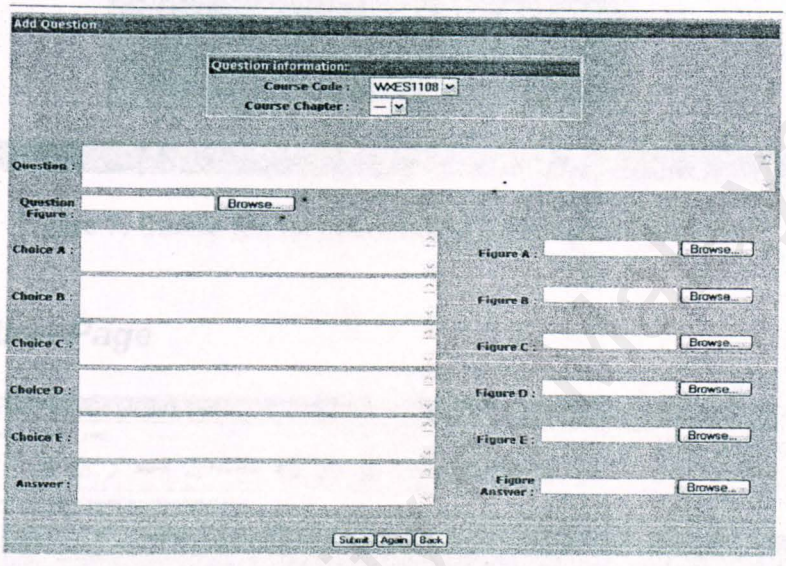

Figure 6: Add Question Form

NOTE: The Question Field cannot be blank. This means that you must at least enter the question. Others fields are optional. However, if the Answer Field is blank, a message will prompt out to confirm whether you want to leave the answer in blank.

If the page is direct from the paper page, the course code is no need to select and there also more a field, "Question Mark for Paper" to fill in.

5.2 View Question

i. From the "Question Management" menu, choose "View Question".

ii. Select a course to view, as shown in figure 7.

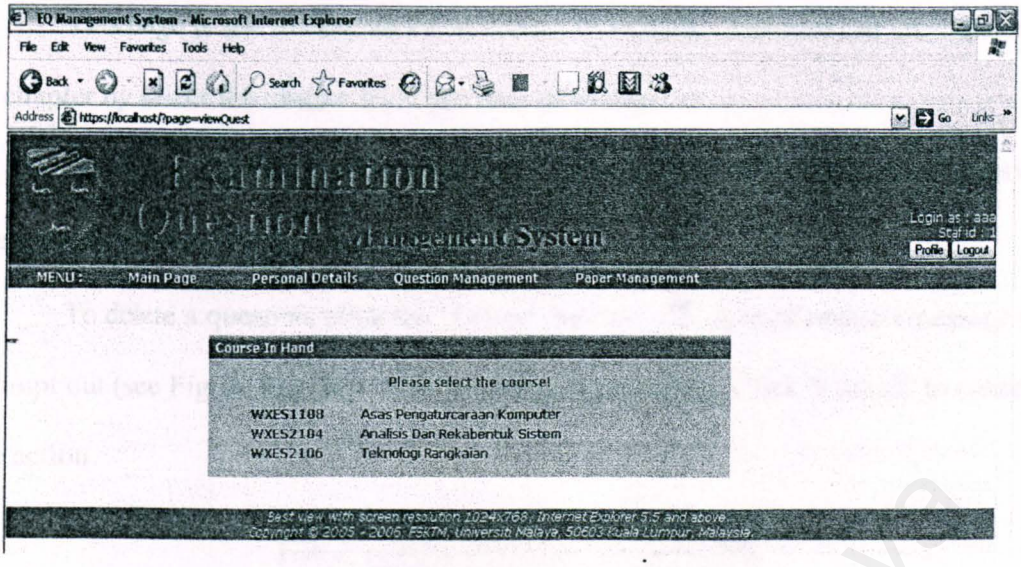

Figure 7: Course list for select before viewing the Question

6. Question Page

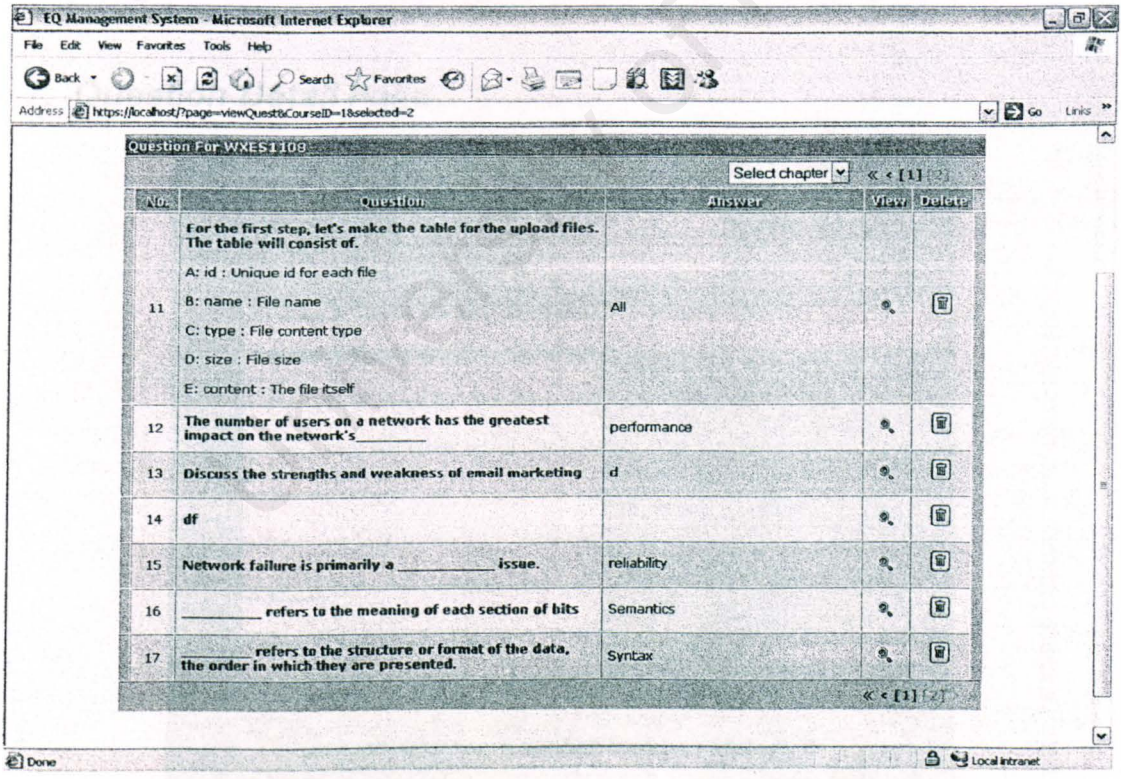

Figure 8: Question Page for course

This page is use to view all the questions in a course. You also can view questions in chapter by select the chapter from the drop down list.

To view a question in detail, click the "View" button --. For more information, see ***Question Detail Page*** on page 9 and 10.

To delete a question, click the "Delete" button —. A confirmation message will prompt out (see Figure 9). Click "Yes" to delete the question. Click "Cancel" to cancel the action.

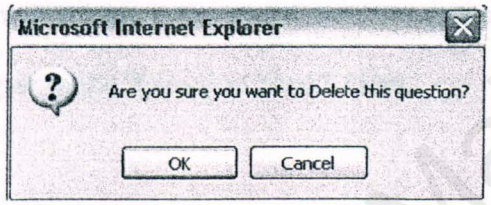

Figure 9: Confirmation message to confirm the delete action on question

7. Question Detail Page

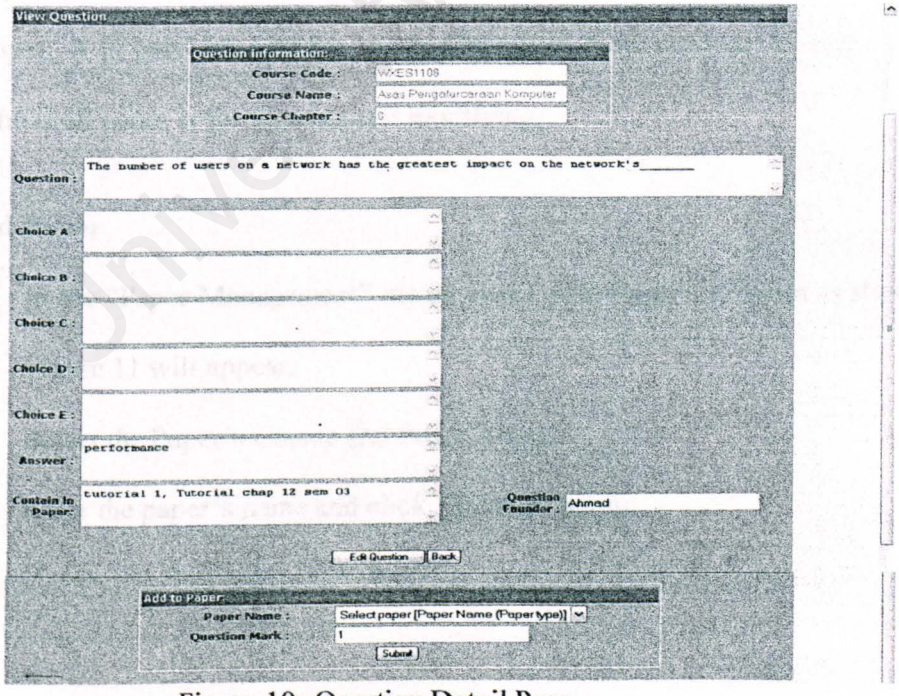

Figure 10: Question Detail Page

This page is to use to display a question in detail. The "Question Information" table on the top of page will show the question is belongs to which course and the chapter. Other information includes the paper name for the question contained and the question founder.

To edit the question, click the "Edit Question" button below the "Contain in Paper" Field.

The question also can be added into paper in the "Add to Paper" table at the bottom of page. Select the available paper name from the drop down list and enter mark for the question in the paper in the "Question Mark" Field.

8. Paper Management

Basically, there will be 5 type of paper. There are Exam, Tutorial, Test, Quiz and other. The paper also categorized to 2 statuses, either "Finalized" or "Draft". For finalized paper, it is only for viewing, no modification is allowed on finalized paper. Where as, the draft paper is for viewing and modifying.

8.1 Add Paper

i. In the "Paper Management" menu, click "Add Paper". A Form as shown in Figure 11 will appear.

ii. Select the Paper's Course and Paper's type.

iii. Enter the paper's name and click "Submit" button.

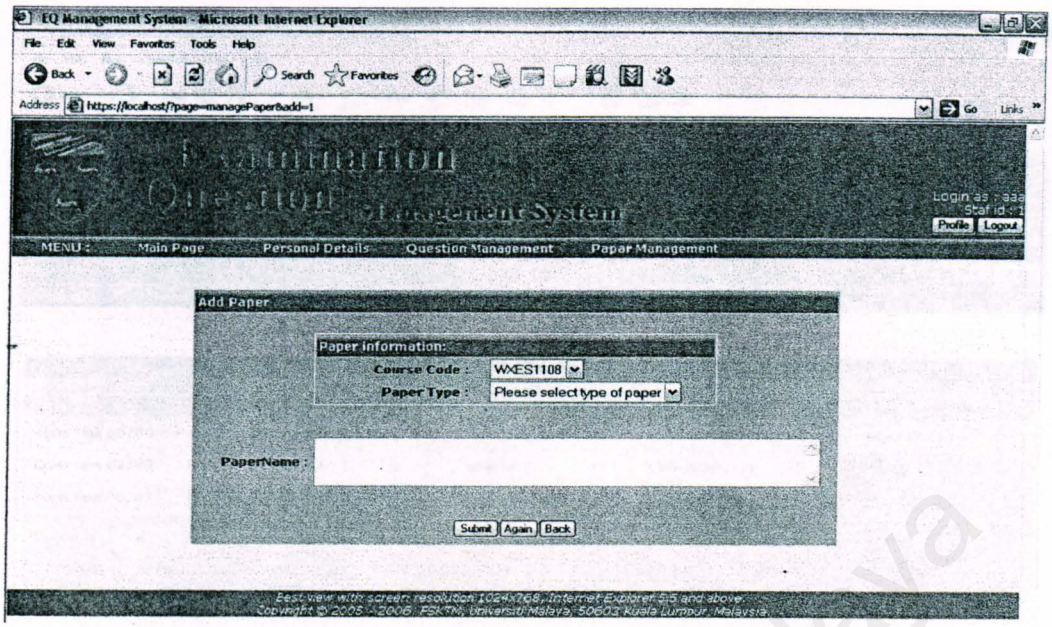

Figure 11: Add Paper Form

8.2 View Paper

i. From the "Paper Management" menu, click "View Paper".

ii. Select the course of paper that wishing to view (see Figure 12).

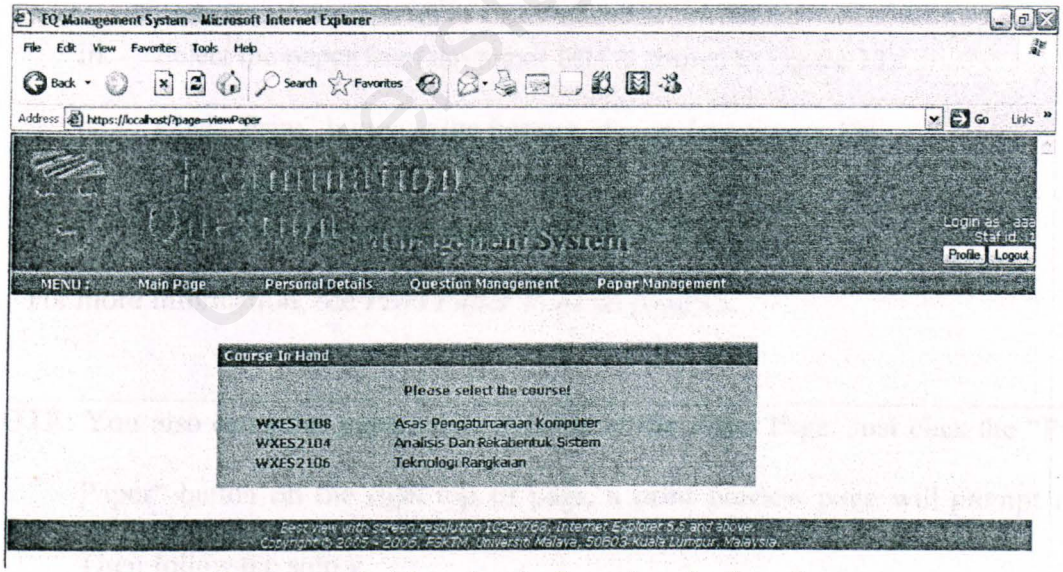

Figure 12: Course list for select before view the list of paper

iii. Select the paper from the paper list (see Figure 13).

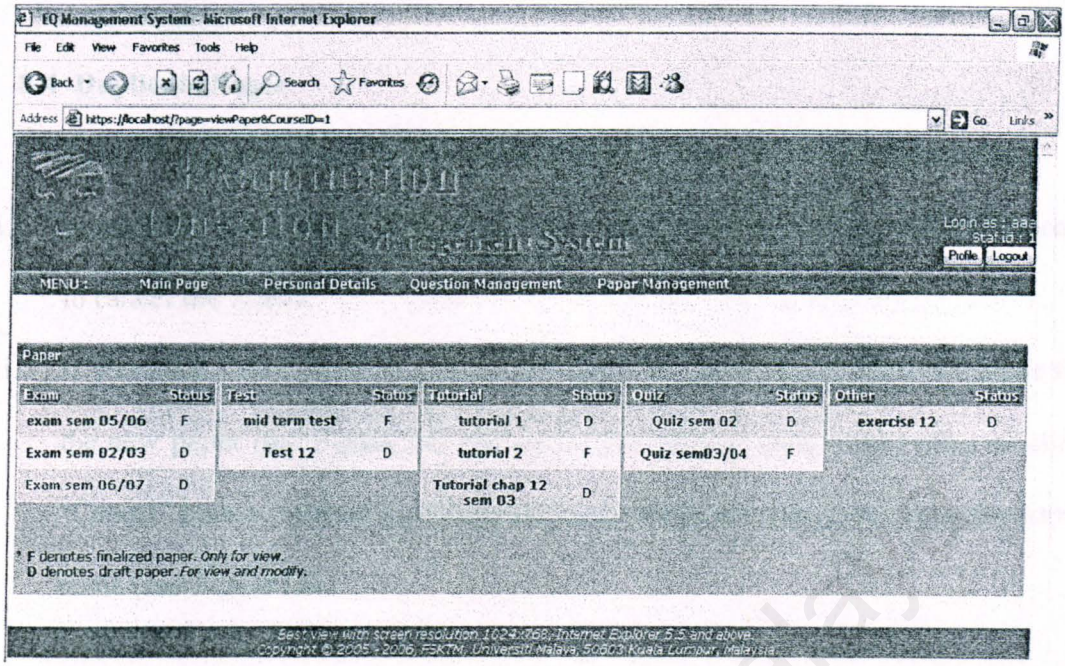

Figure 13: Paper list of a course

8.3 Print paper

i. From the "Paper Management" menu, select "Print Paper".

ii. Select the course of paper wishing to print (as shown in Figure 12).

iii. Select the paper from the paper list (as shown in Figure 13).

iv. Click "Print" button at the bottom of page (see Figure 19).

v. Click PRINT to print the paper (see Figure 20).

For more information, see ***Print Paper Page*** on page 15.

NOTE: You also can print paper while you are in the Paper Page. Just click the "Print Paper" button on the right top of page, a print preview page will prompt out. Then follow the step v.

For more information, see ***Paper Page*** on 13.

8.4 Duplicate Paper

i. Click "Duplicate Paper" button at the bottom of Paper Page (see Figure 16).

ii. A confirmation message will prompt out. Click "Yes" to continue. Click "cancel" to cancel the action.

iii. If you click "Yes", a message asks for input will prompt out. Enter the name for the new paper (see Figure 14) and click "Ok". If you enter a null value or click "Cancel" button, a message will prompt out saying that you do not enter the paper name (see Figure 15).

Figure 14: Message box prompt for user enter the paper name.

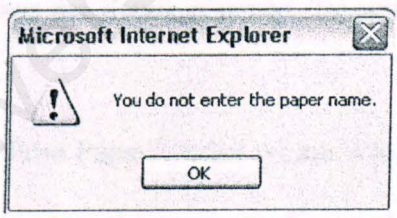

Figure 15: Alert message warn you that you do not enter the paper name.

9. Paper Page

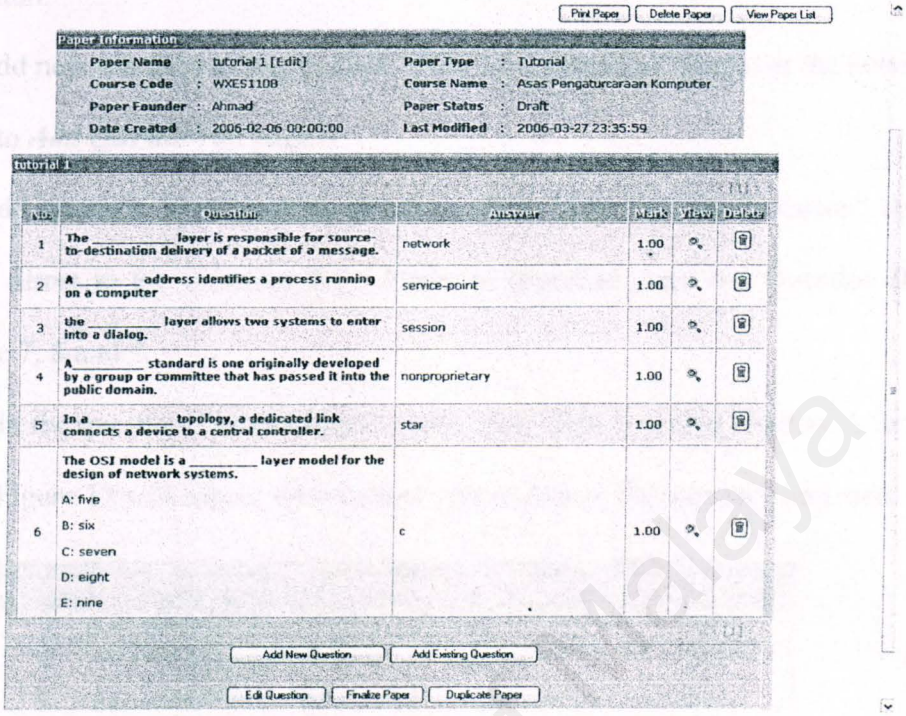

Figure 16: Paper page

This page is for viewing the questions contain a paper. The "Paper Information" table on the top of page shows the detail of paper. To edit the paper, click "Edit" link beside the Paper Name.

To print paper, click "Print Paper" button which is located at the right top of page. Another window will prompt out as the preview of printed page. For more information about print preview, see ***Print Paper Page*** on page 15.

To delete paper, click "Delete Paper" button beside the "Print Paper" button. A confirmation message will prompt out. Click "Yes" to delete paper and click "Cancel" to cancel the action.

To back to the paper list, click "View Paper List" button that located beside the "Delete" button.

To add new question to paper, click "Add New Question" button at the bottom of page. Refer to ***Add Question*** on page 6.

To add question from existing question, click "Add Existing Question" button. Then it will direct to the Question Page. Refer to ***Question page*** and Question ***Detail Page*** on page 7, 8 and 9.

To edit the questions' sequence and mark, click "Edit Question" button. A form as shown in Figure 17 will appear which allow you to change the sequence and mark.

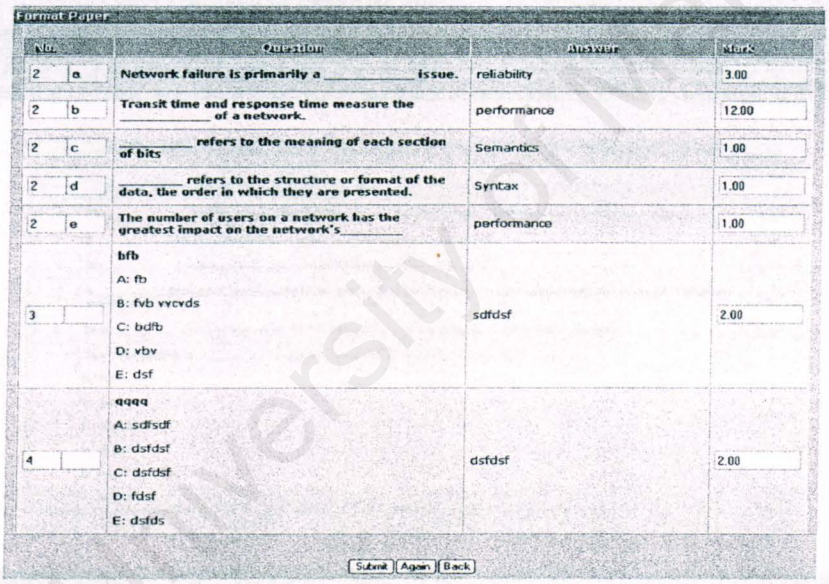

Figure 17: Form for edit the questions in paper.

To finalize the paper, click "Finalize Paper" button. A confirmation message will prompt out. Click "Yes" to finalize the paper. Click "Cancel" to cancel the action (see Figure 18).

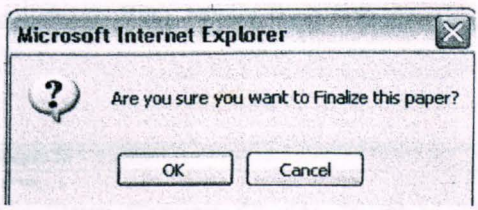

Figure 18: Confirmation message to confirm the finalize paper action

To duplicate the paper, click "Duplicate Paper" button. Refer to ***Duplicate Paper*** on page 12 for how to duplicate a paper.

10. Print Paper Page

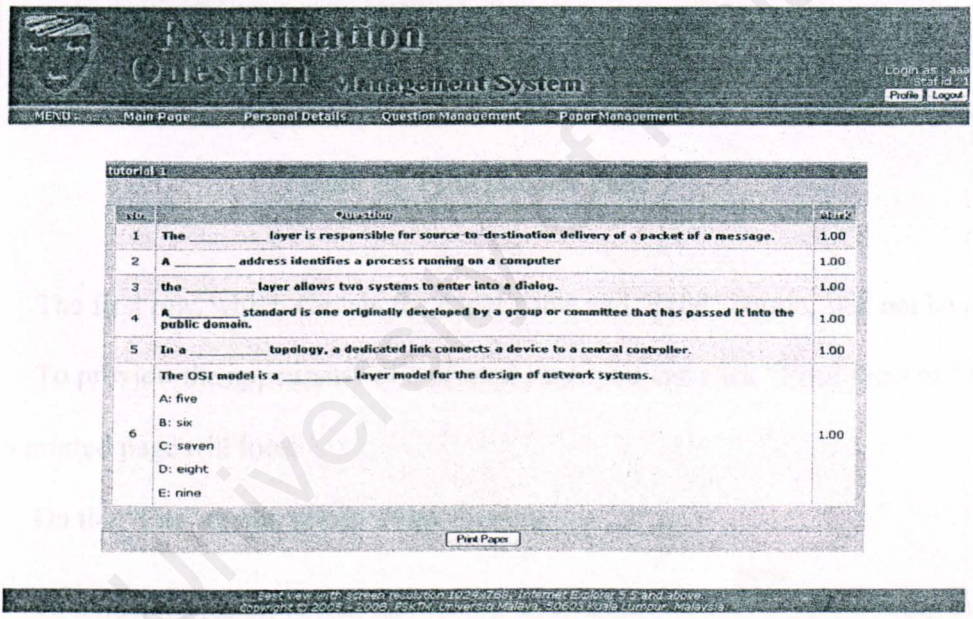

Figure 19: Print Paper Page

The print paper page will display the questions and the questions' mark only.

To print the paper, click "Print Paper" button at the bottom of page. For more information on how to print paper, see ***Print Paper*** instruction on page 11.

A window will prompt out if the "Print Paper" button is clicked (as shown in Figure 20).

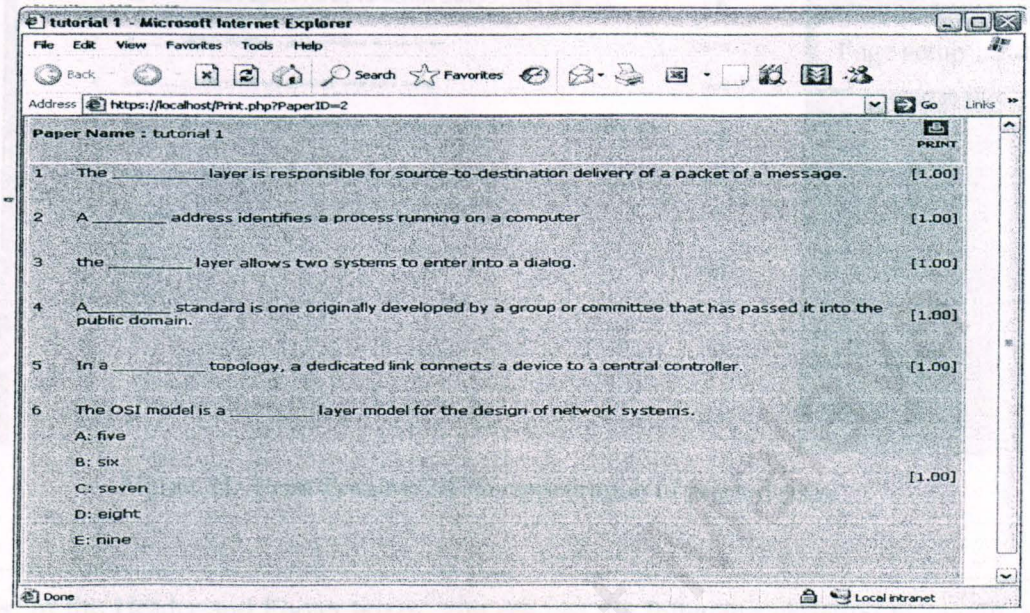

Figure 20: Print preview page

The first row, which contain the paper name and "print" button, will not be print.

To preview the appearance of a printed page, you can click "Print Preview" to see how a printed page will look.

i. On the "File" menu, select "Print Preview".

ii. To adjust the paper, header and footer, and margin, click , Page Setup button (see Figure 21).

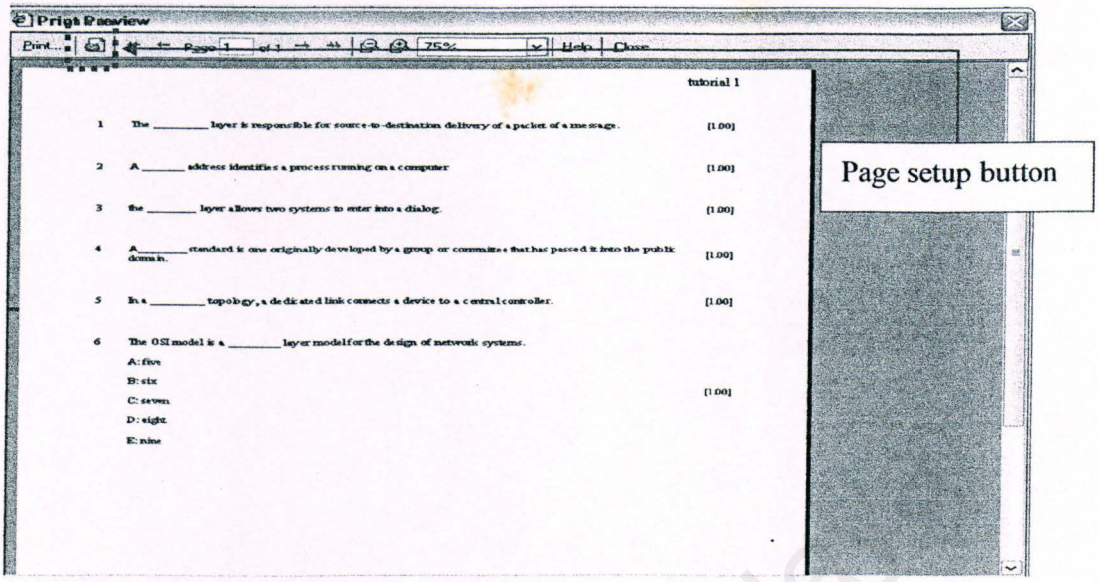

Figure 21: Print Preview of the appearance of printed page

Tips: In the Header and Footer boxes, you can use the following variables to specify the information to be printed. Variables can be combined with text.

Variables	Description
&w	Window title
&p	Current page number
&P	Total number of pages
&b	Right-aligned text (following &b)
&b&b	Centered text (between &b&b)
&&	A single ampersand (&)

For more information on how to print a web page, click "Contents and Index" on the "Help" menu of the browser. At the contents of "*Getting started with Internet Explorer*, choose ***Printing and Saving Information***, select ***Print a Web Page*** and click ***Related Topics*** for more information on print preview and customizing the printed page.